STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

ABP

EDITORIAL STAFF

E. L. SHANER, *Editor*
E. C. BARRINGER, *Managing Editor*
E. C. KREUTZBERG, *Engineering Editor*

ASSOCIATE EDITORS

A. J. HAIN — E. F. ROSS
G. H. MANLOVE — J. D. KNOX
A. H. ALLEN

New York — B. K. PRICE—L. E. BROWNE
Pittsburgh . . . — E. A. FRANCE JR.
Chicago . . . . . — W. G. GUDE
Washington . . . . . — L. M. LAMM
London . . . . — VINCENT DELPORT

Published by
PENTON PUBLISHING CO.
PENTON BUILDING
CLEVELAND, O.

•

JOHN A. PENTON, *Chairman of Board*
C. J. STARK . . . . *President*
J. D. PEASE . . . *Vice President*
F. V. COLE . . . . . *Secretary*

BUSINESS STAFF

GEORGE O. HAYS, *Business Manager*

New York
J. F. AHRENS — E. W. KREUTZBERG
Pittsburgh . . . . — S. H. JASPER
Chicago . . . . . — I. C. PELOTT

Cleveland
JOHN HENRY — R. C. JAENKE

R. T. MASON, *Circulation Manager*

ABC

Contents . . March 11, 1935

Volume 96 ◆ Number 10

AS THE EDITOR VIEWS THE NEWS 13

NEWS OF THE WEEK:

Labor Paradox: Millions Idle, Skilled Labor Scarce 14
Higher Farm Prices Stimulate Implement Buying 15
Steel Corporation Surplus Still Half Billion 16
H. A. Roemer Heads Niles Sheet Mill 16

Labor 17
New Capacity 17
Institute 17
Production 18
Meetings 18
NRA 83
Financial 83

Mirrors of Motordom 19
Windows of Washington 21
Industrial Men in the Day's News 23
February Ingot Output Best in Eight Months 24
Obituaries 25
January Exports Up Third Over 1934 26
EDITORIALS—Revival of Interest in Rehabilitation 27
THE BUSINESS TREND 28

ENGINEERING DEVELOPMENTS:

Paint vs. Corrosion 30
Furnace Atmospheres 34
Insulating Brick 37
Icemaking Machine 40
Methods and Materials 44
Repairing Goggles 44
Alloys of Iron Research 46
Gas Cut Bridge Shoes 47
Progress in Steelmaking 50
Slow Blowing of Furnaces 52
Oil Steels Symposium—II 53
A.I.M.E. Reports 55
New Equipment 58
Trade Publications 64

MARKET REPORTS AND PRICES 65-84
CONSTRUCTION AND ENTERPRISE 85
ADVERTISERS' INDEX 92

BRANCH OFFICES:

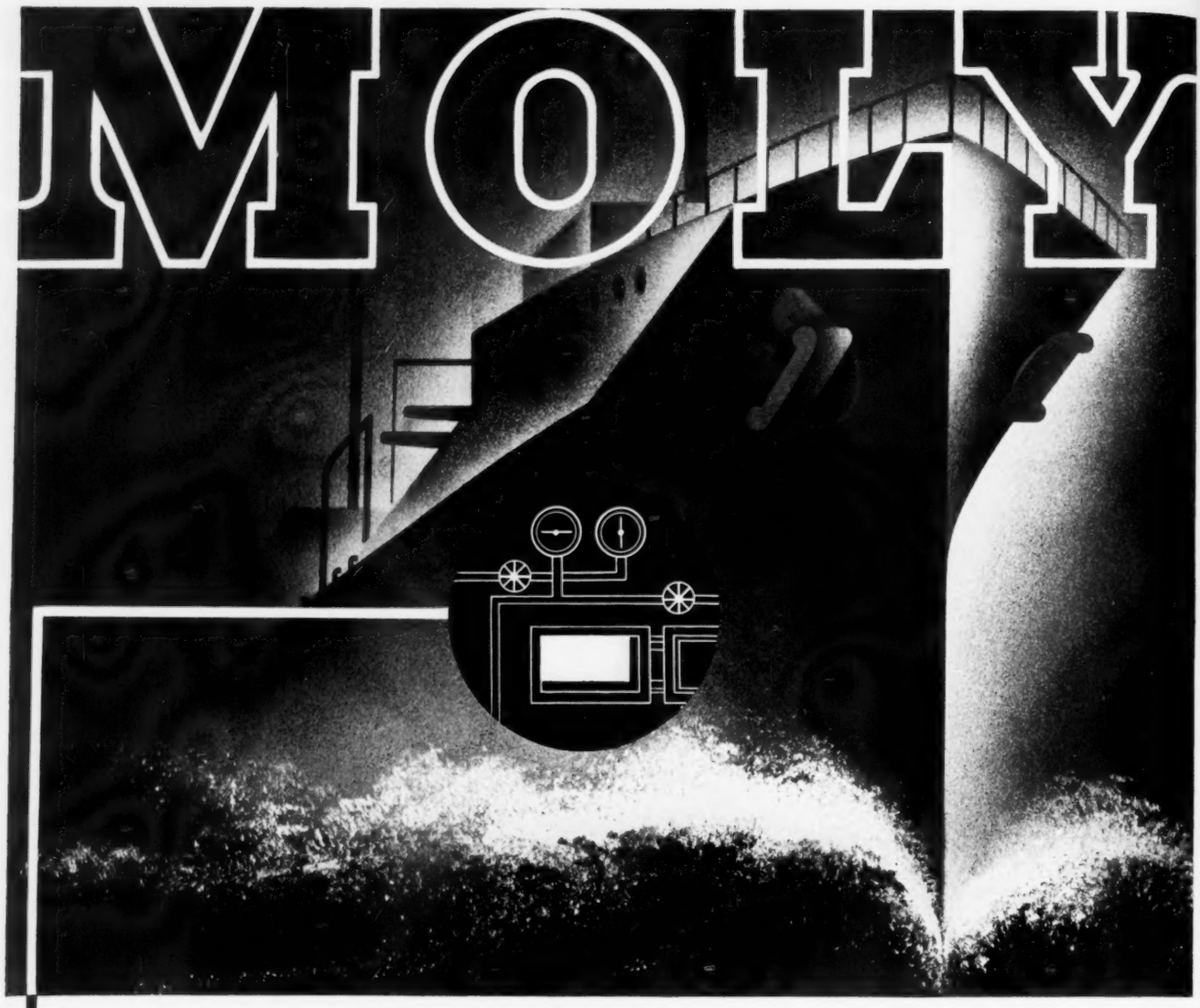
New York . . . . . 220 Broadway
Chicago . . . . Peoples Gas Building
Pittsburgh . . . . . Oliver Building
San Francisco . . . . 441 Merrit Ave., Oakland, Calif., Tel. Holiday 4290
Washington . . . National Press Building
Cincinnati . . . 418-420 Sinton Hotel
London . . . . . Caxton House Westminster, S. W. 1
Berlin . . Berlin, N. W. 40, Roonstrasse 10

Member Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association.

Published every Monday. Subscription in the United States, Cuba and Mexico, one year $4, two years $6; in Canada one year $6.60, two years $11.20; in Great Britain and European countries, one year £2.

Entered as second class matter at postoffice at Cleveland under the Act of March 3, 1879.

Copyright 1935 by Penton Publishing Co.



gives vitality to high-temperature steels

PICTURE the boilers of a modern destroyer splitting the sea at top speed. Or those parts under the heavy pressures and temperatures of oil-refinery requirements. . . . "Moly" gives their steel the *extra* quality to meet extraordinary demands.

Not only is Moly the most effective economical element for raising the creep strength of steel. But it also prevents temper embrittlement, reduces blue brittleness, and intensifies the corrosion-resisting properties imparted by other alloying elements.

Example: A low carbon steel containing from 4-6% Chromium gives good corrosion resistance in oil-refining service. The addition of only .50% Molybdenum has been found to improve greatly this desirable quality and to result in increased recovery in the foundry as well as in the added virtues mentioned above.

While there are various types of steels in commercial use for which creep strength claims are made, the ones that grow in popularity are invariably those containing Moly. The effects of Molybdenum are so remarkable that there are today several foundries which, to insure the retention of their good reputation, insist on adding Moly to their steels of this type.

Keep posted on the rapid progress of Molybdenum. Let us put you on the mailing list of our periodical house organ, "*The Moly Matrix.*" A simple post-card request is all that is necessary. Write also for these interesting books: "*Molybdenum in* 1934" and "*Molybdenum in Cast Iron* — 1934 *Supplement.*" And, if you've an alloy problem of your own, our metallurgists and Detroit experimental laboratory are at your disposal in solving it. Climax Molybdenum Company, 500 Fifth Avenue, New York City. (In Canada: Railway & Power Engineering Corporation, Ltd.)

CLIMAX Mo-lyb-den-um

As the Editor Views the News

INDUSTRY is about to witness a hectic and hilarious debate in congress over the fate of NRA. The 17-point plan proposed Thursday by Donald Richberg for a two-year extension (p. 21) seems to have been given a cool reception by most of the members of the senate finance committee. This reflects clearly the marked change in the political aspects of the recovery act. In 1933 espousing the blue eagle was a political asset to senators and representatives. Today unqualified defense of the bird is considered by many to be a serious liability politically. The force of legislative criticism is in the ascendancy.

• • •

The suggestion that the functions of NRA be transferred to the department of labor and the federal trade commission is winning attention.

A Tempest in a Teapot

However, Senator Wagner will fight to retain for A. F. of L. the present NRA concession for racketeering. Senator Borah would restore the antitrust laws to full force. Senator Wheeler would punish corporate bigness. The senator from Louisiana would throw the blue eagle to the fishes. It is difficult to see how such sharply conflicting views can be harmonized to bring about a workable extension of NRA. Industrial executives probably will not know for weeks whether it will be altered slightly, revised drastically or abandoned in toto.

• • •

Confusion over NRA is not confined to the halls of congress. In industry, where management has done a pretty respectable job of trying to make codes work under discouraging conditions, the difficulties are mounting rapidly. The restrictions on the number of hours men can work has forced many plants to go from one to two or three shifts. This has accentuated the problem of finding a sufficient number of skilled workers (p. 14) in certain occupations. Even with the present less than normal rate of operations, a serious shortage of skilled labor has developed. With a slightly higher volume of business, this problem would become acute. Here we have an actuality—not a theory—which challenges one of the basic principles of NRA. Likewise it emphasizes the folly of the pending 30-hour bill and the vicious labor disputes bill.

More Skilled Men Needed

• • •

Sentiment in congress probably favors retaining Section 7a, yet the experience of those who have had most to do with labor relations under this clause argues strongly for its revision or abandonment. The voting in the automobile plants, shows that exactly 75 per cent of the employes who cast ballots (p. 19) indicated no affiliation with the seven professional labor unions or the employe representation organizations. Does this not prove that in the automobile industry an overwhelming majority of employes are apathetic to ponderous machinery for collective bargaining? The assertion by new dealers in 1933 that the American worker was eager to join a professional union for the purpose of bargaining collectively was a deliberate fraud. Will they be convinced by the proof, which is of their own creation?

Votes Dispute Need of 7a

• • •

The propensity for inconsistent action displayed by the present administration is beyond human understanding. The new deal is committed unmistakably to higher prices. Through NRA it is attempting to shorten hours and raise wages. Yet in the first reciprocal trade agreement involving imports of iron and steel, the state department reduced tariffs (p. 30, March 4 issue) on seven iron and steel products, thus opening the door a little wider to the influx of steel from a low-wage, long-hour country. Many persons favor the idea of easing the intensity of nationalism which exists today, but they will smile at the state department's naive attempt to justify lower duties on glass and steel on the ground that the lower prices of the imported material will "stimulate" building in the United States.

Scrambled Price Policy

E. L. Shaner

Labor Paradox: Millions Unemployed, Yet Scarcity of Skilled Men Threatens

THE depression has produced, among other things, some strange paradoxes. Want among millions in a land of plenty is incongruous in itself, yet is made more so by the fact that despite the legions seeking employment, some industries are finding it difficult, if not impossible, to obtain certain types of workers. The scarcity concerns the skilled employe and, unfortunately, the unskilled individual predominates in the ranks of the idle.

So far this situation has not become sufficiently acute to cause a marked retardation in operations of the metalworking industry, though there are instances of forced curtailment in schedules of certain plants because of shortage of skilled men.

Workers without the desired experience have been taken on in some cases for lack of something better, the net result of which has been a general lowering of efficiency of personnel. Naturally, this efficiency will improve with experience, but in the event of a marked and sustained improvement in business, the metalworking industry will find that obtaining an adequate supply of workers skilled in certain operations will constitute a most vexing problem.

Shortage of Welders

Scarcity has been most evident in the number of available welders, tool and die workers and automatic machine operators. Rising operations of the automobile and farm implement industries have employed a large number of specialists in the latter two classifications. Welders appear to be scarce, or at least not overly plentiful, in metalworking centers.

In Chicago this situation is attested by the daily appearance of calls for such men in the Help Wanted columns of local papers. A shortage also is apparent in Cleveland. Diemakers are being sought in Chicago, while automatic screw machine operators have been in demand there in Toledo and elsewhere recently, with the supply somewhat inadequate.

After several years of depressed operations, the farm implement industry has been caught in a flood of business that approaches the volume of prosperous years. Production has been stepped up substantially but the attainment of higher schedules at a number of plants has been balked by the combination of restricted NRA working hours and an insufficient supply of skilled hands.

One company has hired men from the farms—unfamiliar with machinery—and is striving to develop them into machine operators. In some instances farm equipment builders have been able to add two and three shifts only by spreading its most capable workers among the three turns to have a skeleton force of skilled men on the job at all times.

One tractor company is reported to have found impossible an attempt to work 24 instead of 16 hours a day, since the man-power was not available to run the machines and to supervise the work. Taking operations of the metalworking industry as a whole, the rate is far from impressive when compared with conditions of the 20's, despite the favorable activity in such industries as the automotive and farm equipment.

In view of the present situation as regards supplies of able workers, the condition of the skilled labor market on the attainment of equally good operations in those industries still afflicted at least partially by the depression would present a serious problem. Passage of the proposed 30-hour bill would cause an even greater labor crisis, in the opinion of many.

Causes of this depletion of the ranks of the skilled are various. In general, it has been a case of industry's fighting the battle of depression without looking to the training of reinforcements to take the place of those who, for one cause or another, have dropped from the front line.

Other factors, however, also have been responsible for the decrease of 5 to 10 per cent yearly in the number of skilled mechanics available for employment. The National Metal Trades association, Chicago, assigns seven different reasons as responsible for this situation. They are:

1. *The Tendency To Specialize:*

Mass production methods necessitate a certain amount of specialization, and to no small degree the extension of the machine-paced production idea has been responsible for the appearance of a class of labor which is neither skilled nor unskilled, but which nevertheless maintains the bulk of production. Large numbers of persons who otherwise might have become skilled craftsmen have naturally drifted into work of this character.

2. *Unstable Employment:*

Periods of depression in an industry, such as that of 1920-21, and even minor fluctuations such as that of 1924, especially when accompanied by unusual activity in other lines, or the development of entirely new industries, serve to induce high-calibered men to leave such industry or

MEN, MEN, EVERYWHERE—BUT FEW SKILLED HANDS: Employment managers who interview such crowds as these, seeking work, find only a small proportion equipped by experience for higher classes of machine operations and welding. Cause: Fewer young men have been trained during the depression; many skilled men have dropped out through age, or into other occupations, while works operations have increased

trade to seek employment elsewhere.

3. *Demands of New Industries:*

Extraordinary expansion in the automobile industry, the development of the radio, airplane and talking movies are typical examples of the growing field of employment offered to skilled workmen, each drawing from older trades a portion of their trained personnel. Not only do these new industries attract the skilled craftsmen, but even more strongly have they lured the young men who might otherwise develop into journeymen in the older trades.

4. *Restricted Immigration:*

This has shut off a supply of skilled workers from abroad—largely men who learned their trade by serving a rigorous and thorough apprenticeship.

5. *High Production Equipment:*

The amount of automatic and semi-automatic machinery and equipment in use has increased rapidly. While such devices are largey manned by semiskilled labor, highly skilled men are required for tooling, set-up and maintenance. The demand for this class of skilled men in other industries constitutes another drain on the ranks of all-around journeymen in the metal trades.

6. *Supervisory Demands:*

With the expansion of industry coincident with a reduction in the number of skilled employes, it follows that greater numbers of foremen and other supervisors are appointed from the ranks of journeymen workers.

7. *Changing Requirements of Skill:*

Concurrent with the increasing demands for skilled labor, the widespread use of precision instruments and the refinement of machine tools and production equipment effected a change in the nature of the skill required of a journeyman. The skilled craftsman today must not only have considerably more technical knowledge but must also be able to perform operations entirely unknown to his predecessor. Thus it is becoming increasingly difficult for older journeymen to keep up with trade progress and development and for employers to find applicants for work who can be economically trained through mediums other than carefully prepared apprenticeship programs.

Employers again are taking an interest in apprentice training after a lapse by many for several years. Under federal direction committees are being formed in various states for the purpose of encouraging and co-operating with industries and individual companies in adopting and furthering apprentice training.

A number of companies, recognizing the need for the development of replacement workers, are intensifying their activities in this field.

Farm Equipment Makers Are Rushed as Relief Funds Spur Mechanization

HOGS have been selling at Chicago lately around $11.50 to $11.75; a year ago they brought about $6.50 to $6.75. Cattle has ranged from $8.50 to $13.25 recently, against $4.75 to $6.50 last year.

On the board of trade, wheat prices are up 11 per cent, corn 65 per cent, and oats 43 per cent compared with a year ago. Prices of dairy products are higher. Farm income last year is estimated to have been about a billion dollars more than 1933.

In the light of these figures, it is not surprising that the farm implement industry, one of steel's good customers, is experiencing its best activity in about five years and is among the leaders of durable goods producers in recovering from the depression depths.

Neither the farmer nor the implement builder is out of the woods yet, but there is more light ahead than there has been for several years. Higher prices for grain and livestock have resulted largely from small production last year when the drought decided to do the AAA one better and left some farmers with little or nothing to show for their efforts.

Many were not affected by the arid weather, however, and profited handsomely in comparison with their poor returns the two preceding years. All feel assured of better things this year, barring a repetition of unreasonable weather, and this confidence is reflected in a demand for various types of agricultural machinery which, in some instances, is taxing the capacity of producers.

Like the automobile industry, farm equipment builders are far from attaining the volume of business reached in 1929, nor do they entertain hopes of matching that record year in sales or earnings. The industry currently is operating at somewhat less than 50 per cent of what it considers a normal year, though in some cases orders are all that could be desired.

Implement business has improved each year since 1932, when sales were the smallest of recent times. Reports to the Farm Equipment institute placed 1932 business for the industry at $117,000,000. This increased only slightly to $120,000,000 in 1933, but last year there was a sharp gain to around $190,000,000. Sales so far this year show a definite gain over the corresponding 1934

When Stars Visited Alabama

Unlike the popular song, stars visited rather than fell on Alabama recently when high officials of the United States Steel Corp. inspected the Tennessee Coal, Iron & Railroad Co. and other Steel corporation subsidiaries in the Birmingham district. Photographed by the Birmingham News at the Ensley plant, as shown above reading from left to right were J. L. Perry, new president of the Tennessee company; Robert Gregg, new vice president of the Steel corporation in charge of sales; W. A. Irvin, president of the Steel corporation; W. J. Filbert, chairman of the finance committee; and Myron C. Taylor, chairman of the board of directors

period, leading to the belief that the industry is destined to experience the most active 12 months since 1930.

Best activity lately has been in tractors, with sales in some districts almost in record volume. Several reasons may be given for this heavy demand, other than the all-important one of better purchasing power.

The return to the horse as a source of farm power, a trend which received much publicity during the worst days of the depression, faded when grain prices started to advance. The automobile has done much to make the farmer mechanical-minded, particularly among the younger generation which, upon assuming management of farm property, has accepted the tractor as the desirable form of power.

Mechanization, consequently, is proceeding steadily, its present acceleration compensating for the impairment suffered the past several years, while the number of horses on the farm is still declining.

Tractors Get the Call

At the same time, the average age of existing horses is increasing and with their efficiency being reduced, more farmers may be expected to be required to turn from animal to mechanical power during coming years. The small tractor, introduced about two years ago, also has been a big boost to sales because of low price.

While the market for a considerable number of farm machines and tools is a seasonal one, tractors have a relatively steady demand throughout the year. Plows are bought for the plowing season, threshers and combines for the harvest period, but tractors find use during the entire 12 months.

Tractors are selling practically as fast as they are being turned out, and judging from the recent rate of buying, some manufacturers will be able to maintain capacity operations for at least the remainder of this half. Heavy backlogs accumulated by certain dealers make deferred deliveries necessary. Business is well distributed over the country, even the so-called drought states reporting a marked improvement.

Confidence of dealers in the 1935 outlook for various other types of farm equipment is seen in the heavier stocks of spring tools which are being taken, such as plows, drills, harrows and disks.

Manufacturing difficulties, principally the result of a scarcity of skilled labor, have not been lacking among certain implement builders. This has been most noticeable at tractor plants and especially among interests located in small cities. Attempts to keep up with the unusually heavy demand have resulted in the addition of extra shifts, and operations of 16 and 24 hours daily are not uncommon.

Shortages of skilled help, including molders, have developed in the smaller centers during such moves, however, and, in instances, have served to retard production either through lowered efficiency or through inability to obtain sufficient skilled men to put on additional shifts.

The situation could be remedied by longer working hours, but NRA code restrictions on maximum hours eliminate this alternative. As a result, there are fears of a possible shortage of certain farm equipment when the period for delivery arrives.

Implement manufacturers naturally are strongly opposed to passage of the proposed 30-hour work bill, in view of their difficulty in obtaining sufficient output under the 40-hour week.

Furthermore, the shorter week would mean higher costs which the industry is attempting to avoid in order not to disturb present selling prices of machinery.

Prices currently show little change compared with last year, most adjustments having been minor.

Steel Corp. Surplus Still Half Billion

UNITED STATES STEEL CORP., largest unit of the iron and steel industry, concluded 1934 with a total earned surplus exceeding $528,000,000, after taking out $28,000,000 for last year's operating deficit and partial preferred dividend, expending $97,000,000 for maintenance, depletion and obsolescence, paying nearly $36,000,000 in taxes, meeting service on bonded and mortgage debt of over $95,000,000, and spending over $9,000,000 for capital expenditures.

This showing was announced March 11 in the thirty-third annual report to stockholders of the Corporation. This position was maintained in the face of an increase of 10 per cent in the number of employes and a 33 1/3 per cent enlargement of the payroll, as its contribution to recovery under provisions of the steel code.

Salient facts concerning the Corporation are as follows, statistics being either as of Dec. 31, 1934, or, where obvious, for the entire year 1934:

Net deficit before charging dividends	$ 21,667,779
Total deficit (including dividends from surplus)	$ 28,873,401
Total earned surplus	$528,575,627
Net working assets	$374,136,082
do, Dec. 31, 1933	$362,685,688

Production

	Tons
Ores—iron, manganese, zinc	10,074,431
do, 1933	8,345,767
Limestone, dolomite, fluorspar and cement rock	6,043,323
do, 1933	5,410,752
Coal	11,724,183
do, 1933	10,227,230
Coke	5,382,345
do, 1933	4,879,785
Pig iron, ferro and spiegeleisen	5,512,805
do, 1933	5,026,209
Steel ingots and castings	8,660,309
do, 1933	8,046,995
Rolled and finished steel products for sale	6,004,585
do, 1933	5,536,322

Capacity

	Tons
Blast furnaces (pig iron, ferro, etc.)	21,108,900
Steel ingots and castings	27,341,900
Finished steel products for sale	19,261,900

Domestic Shipments

	Tons
Rolled and finished steel products	5,391,791
do, 1933	5,405,801
Pig iron, ingots, ferro and scrap	158,047
do, 1933	174,570
Coal, coke, iron ore and limestone	2,261,826
do, 1933	1,830,994
Sundry materials and by-products	160,035
do, 1933	152,726
Total tons all kinds of materials, except cement	7,971,699
do, 1933	7,564,091

Export Shipments

	Tons
Rolled and finished steel products	514,175
do, 1933	399,434
Pig iron, ferro and scrap	7,546
do, 1933	512
Limestone	9,193
do, 1933	.....
Sundry materials and by-products	56,453
do, 1933	25,447
Total tons all kinds of materials, except cement	587,367
do, 1933	425,393

Gross Sales by Manufacturing, Iron Ore, Limestone and Coal Companies, Including Cement

Domestic (excluding inter-company sales)	$354,124,236
do, 1933	$322,188,709
Export	$ 37,244,437
do, 1933	$ 26,142,912
Inter-company sales between subsidiaries for conversion and resale	$135,868,278
do, 1933	$118,917,647

Maintenance

Ordinary repairs and maintenance	$ 51,102,743
do, 1933	$ 38,415,539
Blast furnace and coke oven relinings, etc.	$ 817,277
do, 1933	$ 791,208
Extraordinary replacements	$ 11,871
do, 1933	$ 5,166
Total expended	$ 51,931,891
do, 1933	$ 39,211,913

Taxes

Total	$ 35,780,384
do, 1933	$ 31,709,992

Employes

Average, 1934	189,881
Average, 1933	172,577

Payroll

Operations and production	$207,564,103
do, 1933	$160,746,223
Construction work	$ 2,939,430
do, 1933	$ 2,403,280

Labor

NATIONAL steel labor relations board March 8 canceled its order for an election for employe representative for collective bargaining at the Duquesne, Pa., plant of the Carnegie Steel Co. This election was ordered on demand of the Fort Dukane lodge of the Amalgamated association, whose charter was revoked following rebellion against the Tighe leadership. The employe association at Duquesne filed suit at Philadelphia to bar the election. The suit has been dismissed, and the boards appear clear.

GREEN $12,000; TIGHE $5000

Amalgamated Association of Iron, Steel and Tin Workers last week broadcast salaries paid William Green, president of the A. F. of L., and Michael F. Tighe, president of the Amalgamated, to refute "boss propaganda." Mr. Green is set down for $12,000, minus 15 per cent voluntarily returned last year; Mr. Tighe at $5000, minus $1333 which he turned back.

PAYS $29,218 FOR IDEAS

General Electric Co., Schenectady, N. Y., in 1934 paid employes $29,218 for suggestions, making nearly $475,000 paid out in this manner since 1926. Box score for 1934: Suggestions received, 11,438; suggestions adopted, 3736. Largest single award ever paid, $1200; average, $10.

SHEET WAGES ARE UNCHANGED

Wage rates in sheet mills having contracts with the Amalgamated Association of Iron, Steel and Tin Workers will be unchanged for March and April. The bimonthly examination of sales sheets last week disclosed an average sales price of 2.63c per pound for Nos. 26, 27 and 28 gage black sheets in January and February, unchanged from the preceding two months.

LEAD IN CHICAGO SAFETY

American Brake Shoe & Foundry Co., Western Electric Co., and Youngstown Sheet & Tube Co. were among the 14 firms named as winners of the Chicago safety council's six months' interplant accident prevention contest. Trophies will be awarded to those companies at a banquet in connection with the thirteenth annual midwest safety conference in Chicago, May 9.

NLRB ORDERS VOTE AT GARY

National labor relations board last week ordered an election among employes at the Gary, Ind., plant of the Gary Screw & Bolt Co., on petition of the Dunes lodge of the Amalgamated association.

¶General Electric Co. paid $2,600,000 in pensions to retired employes in 1934. Assets of the General Electric pension trust now exceed $23,000,000.

New Capacity

COUNT that week lost for the steel industry that does not bring some new mill. Last week sustained interest by these developments:

The apparent approach of an announcement by the National Steel Corp. that it has awarded a 75-inch continuous wide sheet-strip mill for its Great Lakes subsidiary at Ecorse (Detroit), Mich. Preliminary work is understood to be well under way and a new building is contemplated.

Recurrence of reports that a survey of the sheet and strip market being conducted by the Jones & Laughlin Steel Corp., Pittsburgh, will lead to its entry into the wide sheet-strip field. Presumably such a mill would be erected at its Pittsburgh district plants, but for a number of years Jones & Laughlin has owned a site in Hammond, Ind., adjacent to the Inland Steel Co. and Youngstown Sheet & Tube Co. plants at Indiana Harbor, Ind.

Meanwhile, the Youngstown Sheet & Tube Co. expects this week to turn over its new wide hot sheet-strip mill at Youngstown, O. Since the contract was awarded only last August, virtually record time has been made. It is understood that the new Youngstown subsidiary—Youngstown Metal Products Co.—will do blanking at the Brier Hill works.

Bethlehem Steel Co. is putting full steam behind its new wide sheet-strip mill at Lackawanna (Buffalo), while Carnegie Steel Co. is not losing any time on its hot strip mill at McDonald (Youngstown).

Institute

THROUGH a questionnaire to members, the American Iron and Steel institute is preparing data on the merits of the basing point system for submission to the federal government.

Details of the questionnaire are not revealed and while the scope is varyingly reported to include numerous phases of code operation, it is believed to be confined mainly to the basing point question with the idea of obtaining the individual reaction of members before drawing up a general statement for Washington.

Action is understood to have been taken on initiative of the Institute that it may not only better present its

Business Succeeds Where Politics Fails

NOTWITHSTANDING the break between Secretary of State Hull and Ambassador Troyanovsky, business can be done between the United States and Soviet Russia, as the recent successful negotiation between the United Engineering & Foundry Co., Pittsburgh, and the Amtorg Trading Corp., New York, proves. In the above photograph representatives of both organizations are signing an agreement for a continuous wide strip mill to be designed by United, similar to the one it is now completing for the Ford Motor Co., Dearborn, Mich., to be erected at the Zaporojstal plant in Russia. A portion of the mill will be built in Russia to the detailed drawings and technical assistance furnished by United. The mill is designed for an annual capacity of 600,000 metric tons of hot and cold rolled strip up to 60 inches wide; it will be electrically driven and equipped with Timken bearings. Shown above left to right, seated, are George T. Ladd, chairman of board and president, United; I. V. Boyeff, chairman of board, Amtorg. Standing: J. Kinney Jr., assistant manager of machinery sales, United; Joseph Michael, counsel, Amtorg; V. K. Bogdan, first vice president, Amtorg; K. C. Gardner, vice president, United; J. S. Crawford, attorney for United; I. Z. Rogachevsky, president, Zaporojstal Steel works, U. S. S. R.; C. M. Munchnic, foreign sales representative, United; N. I. Naryskin, metallurgical engineer, U. S. S. R.

side of the controversy over the general aspects of the existing system, but also be in a position to suggest any possible changes which may be deemed desirable within the existing structure.

The study this time is believed to be prompted by the indication that the King subcommittee of the senate judiciary committee will make an exhaustive study of code operations for use in working out the future of NRA, and by the dispute between the federal trade commission and NRA on the specific quetison concerning the steel basing point system.

The former body is understood to regard the system as a form of price fixing and in violation of commission's order in the Pittsburgh plus case, while the latter, according to the quoted word of Co-ordinator Richberg, does not regard the system as price fixing.

Production

REVERSING the trend of the past weeks, steelmaking rose 2 points last week to 50 per cent. This increase was reflected largely by gains in the Pittsburgh, Chicago, Youngstown and Wheeling districts, while all other districts noted decreases, except Cleveland and Birmingham which held unchanged. Most district steelworks face uncertain operating schedules this week. Details follow:

Youngstown—Up 5 points last week to 55 per cent, with a further gain indicated for this week. Valley mills are experiencing a bulge in orders, particularly for pipe.

Chicago—Rose 2 points to 55 per cent, first increase in three weeks. Blast furnace operations are unchanged, with 13 of 36 steelworks stacks active. A steady steelmaking rate is in prospect for the balance of March.

Pittsburgh—Up 1 point to 38 per cent, reversing the trend of the last four weeks. A leading interest's open-hearth operations account for the advance, owing to current schedules on rail production.

Slow blast is being taken off several of the 23 active furnaces in the district, and individual blast furnace rates remain unchanged from a week ago, except that Jones & Laughlin Steel Corp. has switched one of its three Aliquippa blast furnaces over from basic to ferromanganese.

Wheeling—Up 14 points to 92 per cent, with 34 out of 37 open-hearth furnaces on schedule. This reverses the downward Wheeling steel operating trend since early February.

Birmingham, Ala.—Steady at 55½ per cent Indications are that unless disturbed by labor troubles in the coal and ore fields, the rate will be maintained for the next three months. Steel production is going for the most part into rails, sheets and wire products. The demand for the heavier shapes continues light.

Central eastern seaboard—Declined for the second consecutive week, dropping off 1 point to approximately 28 to 29 per cent. This reduction came in the face of an increase of one open hearth at each of two eastern Pennsylvania plate mills. One of these plate mills is now operating six open hearths. The immediate outlook is for little change.

New England—Off 2 points to 61 per cent, with steelworks schedules for this week likely to lower production to approximately 58 per cent.

Cleveland-Lorain—Unchanged at 74 per cent, Corrigan, McKinney steel Co. operating 10 open hearths, Otis Steel Co. 8, and National Tube Co., Lorain, 11.

Buffalo—Down 2 points to 38 per cent, with 14 open hearths in production, one less than in the previous week. Producers here state there is scarcely enough business to warrant continuation of the present output and there may be further curtailment unless sales and shipments improve.

Steelmaking Operations

Percentage of Open Hearth Ingot Capacity Engaged in 10 Leading Districts

	Week ended Mar. 9	Change	Same week 1934	Same week 1933
Pittsburgh	38	+ 1	34	14
Chicago	55	+ 2	50	12
Eastern Pa.	28½	— 1	31	10
Youngstown	55	+ 5	56	17
Wheeling	92	+14	70	†
Cleveland	74	None	82	20
Buffalo	38	— 2	52	16
Birmingham	55½	None	52	15
New England	61	— 2	66	†
Detroit	94	— 6	93	†
	50	+ 2	51	13½

† Not reported in 1933.

CANADIAN IRON, STEEL OUTPUT UP SLIGHTLY IN JANUARY

Canadian output of steel ingots and direct steel castings in January was 59,526 gross tons, compared with 58,732 tons in December and 60,787 tons in January, 1934.

Ferroalloys output in January was 2807 tons, compared with 3641 tons in December, and 1814 tons last January.

The corrected total for pig iron in January is 44,416 tons, against 42,364 tons in December.

Revised totals for 1934: Steel ingots and castings, 759,070 tons; pig iron, 406,995 tons; ferroalloys, 33,085 tons.

Three stacks were active on Feb. 1—at Sidney, N. S., and Hamilton and Port Colborne, Ont.

Meetings

SPRING engineering conference of the Association of Iron and Steel Electrical Engineers, Empire building, Pittsburgh, will be held Wednesday evening, April 24, and all day Thursday, April 25, at the Ohio hotel, Youngstown. J. L. Miller, assistant chief engineer, Carnegie Steel Co., Youngstown, will be general chairman, and F. E. Leahy, fuel engineer, Youngstown Sheet & Tube Co., Youngstown, general secretary.

WAREHOUSE MEN TO CHICAGO

American Steel Warehouse association, Terminal Tower, Cleveland, has scheduled its 26th annual convention at the Edgewater Beach hotel, Chicago, May 14-16, according to Walter S. Doxsey, secretary.

HOMESTEAD CLUB MEETS

Second annual dinner of the Homestead Steelworks club was held at Homestead, Pa., March 4. Invitations were issued to employes and officials of the Clairton, Duquesne and Edgar

(*Please turn to Page* 82)

Roemer Heads Niles Sheet Mill

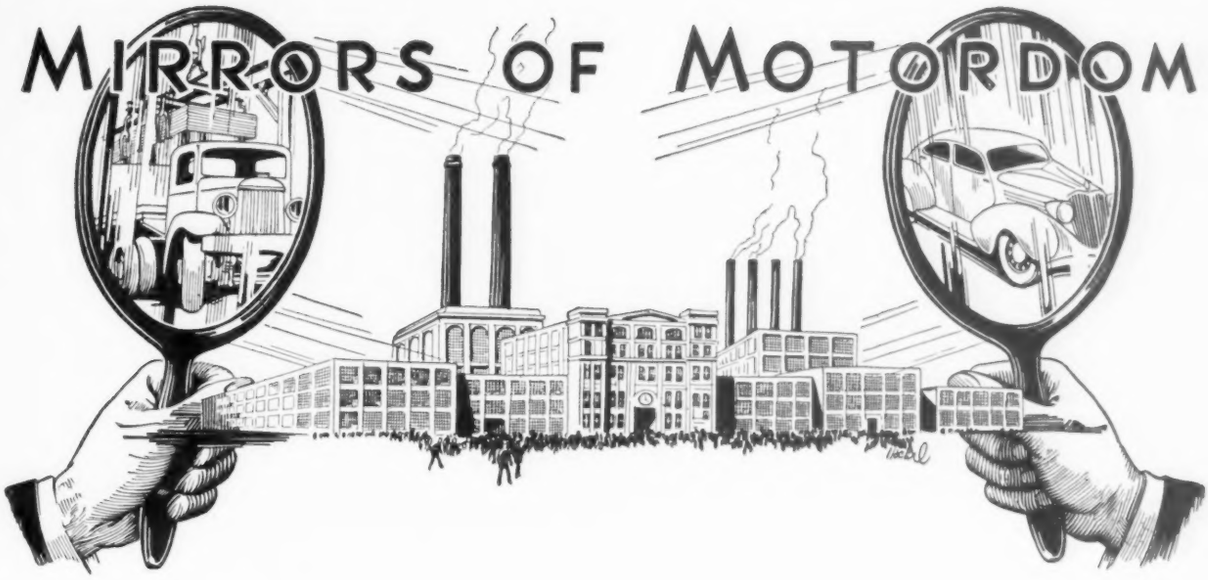
NILES ROLLING MILL CO., Niles, O., of which Henry A. Roemer, chairman and president of the Sharon Steel Hoop Co., Sharon, Pa., is president, has been organized to take over the Falcon sheet mill at Niles from the Empire Sheet & Tin Plate Co.

Immediately upon formation of the new company contracts were let, totaling $200,000 for modernization of the Falcon plant, idle for several years. The four continuous furnaces will be modernized, and a 3-high breakdown mill, automatic feeding, catching and shear equipment installed. Operations are expected to begin about June 1.

Capacity of the improved mill will be 60,000 to 70,000 tons annually of black, blue annealed, cold rolled and galvanized sheets, and terne plates. Later, tin plate may be made. Sheet bars will be purchased from the Sharon company.

Personnel of the new company will include former Sharon Steel Hoop Co. and Youngstown Pressed Steel Co. executives, the latter being a subsidary of the former. These will include Donald W. Frease, vice president and general manager of the new company; Myron C. Summers, vice president in charge of sales; James A. Roemer, secretary and treasurer; Donald J. Neuman, sales manager; Edward G. Fenton, works manager; and David S. Smith, superintendent.

MIRRORS OF MOTORDOM



DETROIT

WHILE outsiders manifest great interest in the present labor and production situation in the automobile industry, Detroit seems peculiarly disinterested.

It refuses to take labor agitation seriously, and proceeds on the assumption that second quarter output of cars and trucks will exceed the first, thus staking the industry to a corking good first half year, which is the really crucial period.

There is no disguising the fact that the elections conducted by the Wolman board have proved an eye opener. True, employe associations have polled as many votes as all outside labor organizations put together, but after all the effort that the industry has put into campaigns to interest workers, three-fourths of the vote has gone down as unaffiliated.

PREFER HANDS-OFF POLICY

In other words, labor is saying as plainly and loudly as it can that it is not particularly interested in collective bargaining or representation or any of the other ideals stressed by the new deal. What it wants is work and wages. Labor's only serious grumble is that, while it is getting 1929 hourly rates, the code prevents its working enough hours per week to net it 1929 weekly earnings.

Incidentally, this apparent preference of labor for work rather than bargaining or agitation is a strong prop to the confidence of the automobile industry that if Washington ceases to keep labor generally churned up, nothing can stop a whopping big retail market for automobiles from developing this spring.

Thus far in the balloting in the automobile industry, out of 123,000 eligible, 104,000 have voted. Employe associations have polled 11,600 votes, outside unions have virtually duplicated that number in the aggregate (but split up into seven groups) while 78,000 have reported no affiliation whatever. The latter number includes some who apparently are enrolled in employe associations.

At Flint last week the A. F. of L. made its strongest showing to date, but Detroit is not disturbed.

This showing of non-interest is the greater when it is considered that the 65,000 employes of Ford, the greater part of whom are in Detroit, are not represented. Presumably, were an election held at Ford — and none certainly will be held — virtually the entire personnel would accrue to the unaffiliated total.

Detroit, by the way, is feeling considerably better about the Ford labor situation than it did two years ago. It is no exaggeration to say that no communist or A. F. of L. organizer could be in Dearborn a half hour without being spotted by a Ford detective and hustled unceremoniously to the city limits, yet there is an opinion that Ford labor is better satisfied and is getting a better break than at any time in history.

In event labor trouble should develop, Detroit expects it to be met with vigorous measures quite in contrast to the tolerance accorded violence in Toledo and Cleveland.

In 1933 the Detroit city administration was extremely sympathetic with labor. The height of its biased position was reached at the time of the tool and die makers strike, when auto makers were compelled to place tool and die work outside the city.

One day representatives of a shop outside Detroit were followed by police when they left a certain automobile plant. Crowding their car to the curb, the police talked vaguely about a violation of traffic laws, meanwhile searching the car. Finding blue prints and drawings, the police delivered a lecture on outsiders taking bread and butter out of the mouths of Detroit labor and hinted that they would not be responsible if violence was encountered on the next trip to Detroit.

The present Detroit city administration and also the municipal officials of many Michigan automobile cities are reported to be awake to the great damage that can be done by small minorities, and the complacent attitude that has been encountered, especially in Cleveland and Toledo, will not be duplicated in Michigan.

The Fisher brothers are reported to be the more grieved by the situation at their Cleveland plant because their original home was in Norwalk, O.; they looked to Cleveland as the nearest large city, and it was there that they got their start in the manufacture of bodies before they became a unit of General Motors.

PRODUCTION GAINS NEAR

So far as production is concerned, assemblies last week totaled 86,325 compared with 83,900 the first week preceding and 82,500 the second. This indicates a comparatively stable situation but it does not accurately delineate the forces which should make for further improvement this month and at least also in April.

Ford, now approaching 6000 a day, six days a week, is close to realizing its schedule of 160,000 units for March. For April its aim is about 175,000, which would approximate the March daily average. Ford is now at or approaching its present peak and cannot be looked to for further substantial gains.

Chevrolet, just swinging into assembly of its master model on a large scale, is just under 3000 units a day and will probably break through 100,000 units this month if it can lick its body problems. In any event, its daily average will be higher in April than in March, making it a factor for the rise.

Plymouth, having paralleled the early start of Ford in December and January, has completed stocking its

dealers and is expected to hold at 9000 to 10,000 units a week.

Hudson-Terraplane is typical of the situation of many manufacturers who eased up two or three weeks ago after they had stocked dealers but are now on the increase again. Hudson has expanded its work-week from four days back to five.

Olds, Pontiac, Graham, Packard—to mention only four—are behind in orders and are still encountering difficulties making prompt deliveries. There has never been a spring in history, even including 1933, when the approach of open and seasonable weather has not developed brisk retail buying.

Hence the best opinion now in Detroit is that automobile production will continue at a substantial rate, say 300,00 and 400,000 units a month through the second quarter and possibly through July. This is qualified only in event the present general uncertainty about Washington policies is not accentuated, and in event real confidence is generated there is a chance of automobile demand going through the roof.

PRESSURE EASES ON STEEL

Steel requirements are something else. There is no longer the great pressure for material that characterized January and early February, but for one thing the industry has geared up to the faster pace.

The chief let-up in specifications has been in the heavy products, which were coming in faster, relatively speaking, than flat rolled lines, such as sheets and strip. Any attempt to increase commitments for sheets and strip finds the mills generally sold through April and some into May.

One peculiar twist to the strong production situation in Detroit is the necessity for automobile manufacturers to maintain larger "floats" or banks of material and parts in keeping with their faster assembling. Some body interests have had to lease outside space for this additional reserve of flat rolled steel.

FOR a measure of styling in automobiles and its effect upon the iron and steel industry, look at fenders.

Time was, before Graham introduced the valance or skirt about four years ago, that a fender was a simple and inexpensive part. A comparatively narrow sheet of 22 or 24 gage, a simple draw, and there was your fender.

Now, a fender is one of the most complicated parts, a set of dies for a front pair costs $50,000, and the total cost of all four fenders is practically as great as the shell of the body itself.

Take a front fender like Olds or LaSalle. It requires a screw motion of the draw die—two actions—to get the roll that is over and in front of the wheel. Consider also the bracing of the valances and, as in the case of Olds and some other lines, what amounts to a lining in the rear fender.

Tied in closely with fenders are running boards. Several years ago the style was to sweep the running boards up into the contours of the front fenders. This, however, proved inconvenient because it necessitated a high step from the ground to the running board and then a low step into the car.

NEW MILLS TO MEET STYLES

Olds in 1934 started the movement back to level running boards, as it threatens to set a new style in radiator grilles this year with a die cast instead of a steel stamped design. LaSalle was next with its front fender sawed off bluntly at the juncture with the running board, and almost all other makers have now followed.

Incidentally, one of the earliest parts approved for the 1936 Buick, to be introduced in September, according to present plans, is the fenders; they will be greatly like the present Olds ones, but with a few refinements in curves.

Stand at a curb, watch the cars go by, and compare the fenders of 1930 and earlier models with the current ones, and the extreme advances in styling become readily apparent. The reason for the great surge in the construction of wide continuous sheet-strip mills also becomes evident.

In the days when the fender literally only covered the wheel, narrow sheets sufficed. But now, with the roll in front, the valance at the side, and the wide valley extending to the hood, the widths specified exceed the wildest dreams of sheet mills five years ago.

In some cases, to avoid excessive scrap loss and circumvent extras for extreme widths, the rear slope of a front fender consists of two moderately wide sheets or strips welded, but the automobile industry hopes that these width extras will be modified through the competition of the increasing number of continuous mills.

Speaking of continuous mills, it is understood that the National Steel Corp. will go ahead shortly with its proposed 75-inch continuous strip mill at the Great Lakes division in Ecorse, while three or four other steel interests, including Jones & Laughlin Steel Corp., at Pittsburgh, are reported to be sounding out the market for a possible entry.

Each year sees more exacting requirements placed upon sheet and strip mills by the automobile industry, and the wider the material that is available the more intricate its use. At present, probably the outstanding demand upon the flat rolled industry is the turret top of Chevrolet, Pontiac and Olds, requiring sheets 100 inches wide.

The steel top and straightening out of running boards bring nearer the consummation of a design for doors calculated to make ingress and egress more convenient.

HUMAN BACKS PUT TO TEST

In growing volume, complaints about the difficulties of negotiating the front and rear seats of cars, due to the craze for low center of gravity, are flowing into Detroit. It is apparent that if the present style is permanent, it will be necessary for the coming generation to be born hunchbacked or to have children's backs broken at an early age and shaped to an angle conforming with low head room.

One designer — F. A. Leisen—is proposing cutting doors three to four inches into the top, thus permitting a person to assume a normal erect position in entering and leaving. It is claimed that the problem of making the roof joint watertight is not insuperable, and the trend toward the all-steel top makes the problem less acute than in the case of soft tops.

Chevrolet's adoption of the all-steel turret top is the principal reason for the delay in achieving real volume production on the master model. A year ago Chevrolet was stymied by the problems in putting coil springs into large production; this year it is the top; manufacturing divisions of Chevrolet are now reported to be expanding their nightly prayers to include a petition

(*Please turn to Page* 83)

Automobile Production

Passenger Cars and Trucks
U. S. Only
By Department of Commerce

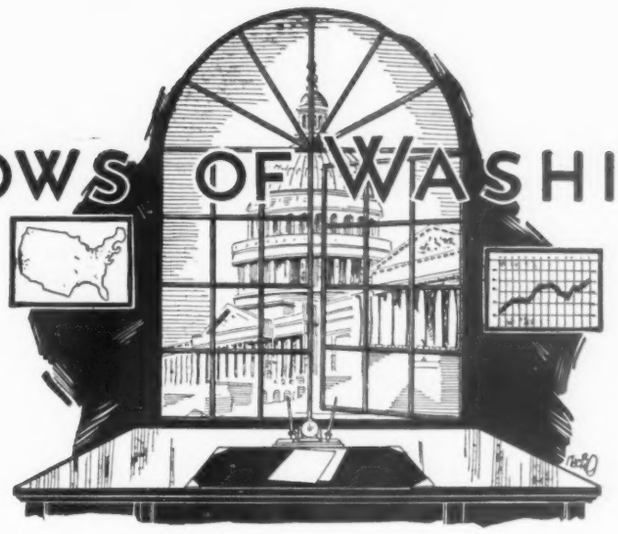
	1933	1934	1935
Jan.	128,825	156,907	292,765
Feb.	105,447	231,707	335,000*
Mar.	115,272	331,263	.....
Apr.	176,432	354,745	.....
May	214,411	331,652	.....
June	249,727	308,065	.....
July	229,357	266,576	.....
Aug.	232,855	234,810	.....
Sept.	191,800	168,171	.....
Oct.	134,683	132,491	.....
Nov.	60,683	78,465	.....
Dec.	80,656	183,187	.....
Year	1,920,057	2,778,739	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:	
Mar. 2	83,899
Mar. 9	86,375

WINDOWS OF WASHINGTON



WASHINGTON

IT IS a despondent, dejected contingent of bituminous coal operators, representing 27 districts, that is expected to return to Washington this Monday (March 11) to resume negotiations with John L. Lewis and his United Mine Workers for a wage agreement beginning April 1.

The threat has been obscured by the bombardment between General Johnson and Huey Long, and the general confusion created by the work relief bill and the further disintegration of NRA, but the prospect of a nation-wide bituminous coal strike this spring appears to be a serious one.

Mr. Lewis and his scale committee—and they constitute the hardest-boiled group of union leaders that any industry has to buck—are adamant in their stand for a 30-hour week and a 15 per cent increase in wages, which they contend is necessary to offset the increase in living costs.

Boost Claimed Prohibitive

This shorter work-week and higher wage rate would only put the cost of production up approximately 20 cents a ton, the United Mine Workers claim. Operators on the other hand see at least a 40-cent a ton jump in their costs, which they claim would be prohibitive and only benefit competing fuels.

Perhaps the American Federation of Labor might not be averse to a bituminous coal strike. Led by Mr. Lewis, who has had about 300,000 miners paying $1 a month dues to his organization, such a strike would be a magnificent demonstration of strength. By contrast, it would make William Green's threats of an automobile strike and the Amalgamated Association's attempt to hamstring the steel industry look puny.

In vain, the President may turn his personal charm loose on the coal miners. With the Black-Connery 30-hour and the Wagner labor disputes bills in the balance, a first class strike might make a deep impression upon congress.

In the meanwhile, public utilities and the railroads have been stocking coal at a fast rate. Conceivably, with heavy stocks of ore on lower lake and no coal to haul up, iron and steel producers with lake freighters might delay the opening of their 1935 season.

Last week Mr. Lewis, through P. T. Fagan, president of district No. 5 of the United Mine Workers, declared that "captive" coal mines of steel companies and other large consumers will be shut down if a new wage agreement is not negotiated. But steel interests, like others, have substantial supplies on hand.

Bituminous coal operators are not only ground down by Mr. Lewis' hard visage but they also have to face an oblique attack on their industry through the Guffey bill. Last week the National Association of Manufacturers filed with a subcommittee of the senate interstate commerce committee a brief challenging the right of congress to regulate interstate mining under the guise of taxation. In effect, it is the same issue that Judge Nields decided at Wilmington in the Weirton case—that "production of a commodity is not commerce in the commodity and while congressional power may regulate commerce it cannot reach production."

ATTACKS ON UTILITIES HOLD BACK STEEL TONNAGE

Iron and steel producers are coming to realize that the Wheeler-Rayburn bill designed to regulate public utility holding companies—more accurately, to destroy them—is very directly affecting them.

More than has been appreciated, tonnage is being lost to the mills. There is a direct reaction in the fact that utilities, fighting for their very life, are spending a minimum on repairs and improvements. Any plans for better generating or transmission equipment have been shelved, and utilities naturally are not spending a nickel more than is absolutely necessary.

One of the thrusts against utility holding companies also lies against all big business. It might be construed that the United States Steel Corp. is a holding company for its various subsidiaries; that the Bethlehem Steel Corp. serves only as an overall pattern for its shipbuilding, steelmaking and steel fabricating interests; Republic Steel Corp., third largest producer, although accounting for only 9 per cent of the country's steel capacity, already has felt the heavy hand of the department of justice.

Still another sensitive spot for the steel industry is pipe line transportation. It is understood confidentially that some really attractive orders for line pipe would be released were there any certainty concerning general business conditions and the administration's attitude, but with utility holding companies on the griddle, and congress probing into pipe line affairs, for one reason to tax them more heavily, this business is not likely to mature.

RICHBERG URGES 17 POINTS AS NRA SETUP WILTS

NRA still seems impressive in the provinces so far as the major industries are concerned and Donald Richberg, chief co-ordinator for the President, has corralled considerable newspaper space in the past week by advocating extension for two years, yet the whole NRA setup in Washington has a hollow sound.

Each week the morale of the organization here loses something vital. From the internal viewpoint NRA has been brittle since General Johnson took his tearful leave last fall, and now comes S. Clay Williams, a really strong man, stepping down as chairman of the industrial recovery board,

which is the five-man successor to General Johnson.

On the surface, all is harmony and Mr. Williams' descendants may treasure the President's "dear Clay" note accepting his resignation, but for weeks it has been evident that no big executive like Mr. Williams could be happy in such a post.

The resignations of Arthur D. Whiteside, head of Dun & Bradstreet, the other business man on the board, and of Sidney Hillman labor union leader, are also expected as soon as they can be negotiated gracefully, considering the senate investigation which got under way last Thursday.

First important witness at this investigation, Mr. Richberg proposed 17 basic principles on which he said the administration generally was agreed. These 17 principles include:

Extension of the recovery act for two years in substantially its present form; retention of the present code machinery, but with restrictions to limit the influence of private bodies; provisions for control of natural resources through regulating output; clear inhibitions on monopolistic practices; extension of the collective bargaining clause, 7a; power to the President to impose codes involuntarily, fix wages, govern maximum hours and prohibit obviously unfair business practices; new glands for the blue eagle to inspirit it and again enlist consumer support; strengthening of the machinery of enforcement, including use of the federal trade act and equity procedure but with penalties restricted to fines.

Flexibility in Hours and Wages

Testifying before the committee, Mr. Richberg expressed the belief that congress should itself set the standards of minimum wages and maximum hours for administrative application in limited codes. Some flexibility in these standards, he said, is absolutely necessary, but the area of executive discretion should be narrowly defined.

In connection with the antitrust situation Mr. Richberg said that "the present exemption from the provisions of the antitrust laws should be restricted and defined so as to provide that co-operative activities, legalized by code provision, shall be lawful only when the codes themselves have been written in compliance with the anti-monopoly requirements of the act."

Dealing with section 7a he said that "the rights of employes should be defined, as at present, in section 7a which contains a statement of principles which are gaining in general understanding and acceptance and which have already received the intrepretation and sanction of the Supreme Court."

Mr. Richberg said that he thought that in order to maintain the continuity of present codes and at the same time to insure any necessary revisions, there should be a requirement that all codes be revised within a limited period of extension so as to conform to the requirements of the amended act.

In the approval of codes the President should be required to make findings that the standards laid down by the congress had been met, Mr. Richberg told the committee. Also, he said, there should be authority provided in the law for those controls over natural resource industries, which are required for eliminating waste, controlling output, stabilizing employment and the protection of the public interest.

TWO REPORTS ON BASING POINTS SOON TO BE ISSUED

President Roosevelt has announced that the two basing point reports are at the White House, namely from NRA and the federal trade commission, and that he has no objection to their being made public.

He has ordered, therefore, that the two reports be made available at the same time. Inasmuch as they are both quite lengthy the best information available is that they will be made public the latter part of this week or early next.

Neither the President nor any of the officials of either the commission or NRA would discuss the reports prior to their publication, but the report still persists that the two reports take the opposite sides of the question with NRA favoring the basing point and the trade commission opposing it.

NEW BILL MAY OUTLAW ALL BASING POINTS

Quite innocently the steel industry is being drawn into a new bill that is being drafted in the senate—in that the bill will provide that the use of the basing point in interstate commerce shall be eliminated. It is expected that the bill will be introduced in the next week or so by one of the prominent members of the upper house.

Several members of the senate have had it in for the chain stores and they have been having a bill drawn up to prevent quantity discounts. One of the group of members interested in this legislation thought that it might be just as well to prevent the use of the basing point. Therefore — unless something arises not foreseen at this moment—the bill will call for elimination of both quantity discounts and the use of the basing point.

CUT IN BRAZIL MANGANESE DUTY PROMPTS RETALIATION

Domestic manganese producers have been very much "griped" since the state department let them down in reducing the import duty on manganese from Brazil.

Any number of protest meetings have been held with and without members of congress. In an effort to halt foreign trade agreements and to terminate the authority to enter into them, Representative Scrugham of Nevada has introduced a bill in the house "that section 350 of the tariff act of 1930 (relating to reciprocal foreign trade agreements) is hereby repealed; and no foreign trade agreement heretofore entered into under such section 350 shall have any force or effect after the enactment of this act."

While the bill has been referred to the house ways and means committee, no one takes it very seriously because it is a well known fact that the President is in favor of these trade agreements and there is no chance that any action, even to the holding of hearings, will be taken on this bill.

ICC PUTS OK ON MORE LOANS TO RAILROADS

New York Central railroad has applied for a government loan of $1,500,000 for railroad maintenance, to which the interstate commerce commission has found no objection.

The loan would be used for 20,000 tons of new rails and 9510 tons of other track material. The estimated cost of the rails is given as $727,500, that of the other track material at $478,500, and the remainder would be used for labor.

The commission also has approved a loan of $11,282,736 for the Erie railroad for a ferryboat and 55 new milk cars.

The commission also has approved a loan of $260,000 to the Waco, Beaumont & Sabine railroad for widening bridges, trestles, etc., and the purchase of second hand locomotives.

PLENTY OF STEEL NEEDED FOR PUBLIC WORKS PROJECTS

If the steel industry does not get its share of the four billion dollar public works fund the President is asking for, there is something the matter with the industry.

As the appropriation now stands in the senate, it has been broken down as follows: For grade crossing elimination, highways, streets and roads, $800,000,000; for rural rehabilitation, $500,000,000; for rural electrification, $100,000,000; for housing $450,000,000; for "projects for professional and clerical persons," (whatever that may mean) $300,000,000; for civilian conservation corps, $600,000,000; for state and local projects, $900,000,000; and for sanitation, prevention of soil erosion, reforestation, etc., $350,000,000.

TO START PROBE ON RULES

Announcement has been made by the tariff commission that a rehearing has been granted, March 29, in the investigation of alleged unfair methods of competition or unfair acts in the importation or sale of coilable metal rules and holders.

Industrial Men in the Day's News

William B. Weston Elevated to Assistant to Vice President of Carnegie, at Pittsburgh; Philip M. Guba New Carnegie, Illinois and Tennessee Sales Manager at Detroit

Mr. Weston (left) has been a Carnegie man his entire career. For 12 years he was in St. Louis territory and 16 at Detroit.

Well known and liked in industry of the Middle West, he is now assigned to special duties in Detroit and Pittsburgh.

Mr. Guba (right), assistant to Mr. Weston for the past two years, has been active in steel sales work for nearly 25 years.

WILLIAM B. WESTON, for the past 16 years manager of sales in the Detroit district for the Carnegie Steel Co., Illinois Steel Co., and Tennessee Coal, Iron & Railroad Co., on March 1 was appointed assistant to the vice president and general manager of sales of the Carnegie company with headquarters at Pittsburgh. He is assigned to special duties in Detroit and Pittsburgh.

Mr. Weston, one of the best known and well liked steel sales representatives in Detroit, is a career man of Carnegie, his entire business life having been with that company.

After filling various posts for the Carnegie company he went to St. Louis in 1907 as district manager of sales, remaining there until June, 1919, when he went to Detroit.

In addition to being a member of the American Iron and Steel institute, Mr. Weston is also affiliated with the American Society for Metals, the Iron and Steel Club of Detroit, and the Detroit club, Detroit Athletic club, Country club and The Recess, all of Detroit. He is a thirty-second degree Mason.

Succeeding Mr. Weston as district manager of sales at Detroit for the Carnegie, Illinois and Tennessee companies is Philip M. Guba, who has been assistant manager in Detroit since March, 1933.

In February, 1911, Mr. Guba went into the general sales department of the Jones & Laughlin Steel Corp., Pittsburgh, leaving in April, 1918, to become sales manager in New York for the Donner Steel Co., from there directing sales in New York, New England and Philadelphia territory.

When Donner was absorbed into the Republic Steel Corp. early in 1930, Mr. Guba was made assistant manager of sales in New York, retaining this post until going with Carnegie in Detroit on March 1, 1933.

Mr. Guba, also a thirty-second degree Mason, is a member of the Cherry Valley Club of Garden City, N. Y., the Bankers and the Union League clubs of New York, and the Detroit Athletic club, Detroit.

ROBERT KORSAN JR., who as noted in STEEL last week has been named to succeed Griswold Price as manager of sales in the St. Louis district for the Illinois Steel Co., Carnegie Steel Co. and the Tennessee Coal, Iron & Railroad Co., recently has been assistant manager of the Chicago district sales office. He came to Illinois Steel in 1896 in the sales department at Chicago. Later he was identified with the freight division of the accounting department, and in 1908 was placed in charge of the claim division. A year later he was transferred to the order department, where he became chief clerk. He was named assistant manager of the Chicago district sales office in 1919.

A. P. Selby, recently assistant manager of sales of the Milwaukee branch of the Chicago district sales office of Illinois Steel, has been named assistant manager of the Chicago office, succeeding Mr. Korsan. He became associated with the company in 1907 as a clerk in the general sales department at Chicago and in 1919 was transferred to the district sales office. In 1931, he went to Milwaukee as assistant manager.

John R. Johnson, recently office manager of the Chicago district sales office, succeeds Mr. Selby at Milwaukee. Mr. Johnson was graduated from the University of Illinois in 1925, starting work then at the Gary works of Illinois Steel. Later he was a clerk in the sales department at Chicago and in 1929 was made a salesman with the Chicago district office. Since last year he has been office manager.

□ □ □

H. H. Holloway, general manager, Apollo Steel Co., Apollo, Pa., has been appointed general manager of Newton Steel Co., Monroe, Mich., subsidiary of Corrigan, McKinney Steel Co., Cleveland.

George Haynes of Vandergrift, Pa., associated with Apollo Steel for the past 15 years, has been appointed general manager of the company's plant at Apollo, succeeding Mr. Holloway.

Howard L. Boadwell, superintendent at the Vandergrift, Pa., works of American Sheet & Tin Plate

Co., has been appointed assistant engineer for Newton Steel.

W. L. Goodhue, for the past three years superintendent of the Farrell-Mercer works of American Sheet & Tin Plate, has been appointed superintendent at the Vandergrift division, succeeding Mr. Boadwell, as noted in STEEL last week.

□ □ □

Harry E. Friedlein, for 25 years associated with Crucible Steel Co. of America and a subsidiary, the Halcomb Steel Co., at Cincinnati, has been appointed assistant manager of the Cincinnati branch of Crucible.

□ □ □

W. A. Hauck has been appointed assistant to the president of Lukens Steel Co., Coatesville, Pa. He is a graduate of Lafayette college with the degree of mining engineer and was formerly assistant comptroller of Bethlehem Steel Corp. Subsequently, he was associated with George W. Goethals Inc. in company management and engineering work, and was also active for several years with a New York stock exchange firm. Prior to joining Lukens, he was

W. A. Hauck

with the American Iron and Steel institute, in connection with the code of the iron and steel industry.

□ □ □

Dr. F. M. Walters Jr., well known in metallurgical circles for his r search studies at the bureau of st ards and Carnegie Institute of nology, and formerly associated Vanadium Alloys Steel Co., Latro Pa., has been named physical meta lurgist for Youngstown Sheet & Tube Co., Youngstown, O. In 1932 he was awarded the Howe medal of the American Society for Metals.

□ □ □

John M. Mulholand, formerly special representative of railroad sales for Youngstown Sheet & Tube C Chicago recently has been appoin manager of railroad sales for the company, with his headquarters continuing in Chicago. Born in Pitts ton, Pa., he attended the Unive of Michigan and later served in

John M. Mulholand

war. From the close of the war to 1932 he was actively engaged in the railroad equipment field, first as district sales manager of Mudge & Co., and then as vice president of sales of the O. F. Jordan Co. He has been with Sheet & Tube since December, 1932.

□ □ □

Edward L. Ryerson Jr., president of Joseph T. Ryerson & Son Inc., Chicago, has been presented the 1935 gold medal of the Benjamin J. Rosenthal foundation, Chicago, for outstanding civic service. The award is in recognition of his services for the public welfare as president of the Community Fund of Chicago and as former state chairman of the Illinois emergency relief commission. In 1932 Mr. Ryerson was the recipient of the Rosenberger medal, awarded by the University of Chicago in recognition of his work in organizing

February Ingots Best in Eight Months

STEEL ingots were produced in February at the rate of 114,255 gross tons per day, compared with 104,969 gross tons daily in January, according to the American Iron and Steel institute. This was a gain of 9286 gross tons per day. Total production in February was 2,742,125 gross tons, compared with 2,834,170 gross tons in January, a decline of 92,045 tons, due to the shorter month.

Cumulative tonnage for two months of 1935 is 5,576,295 gross tons, compared with 4,154,347 gross tons for two months of 1934. The average daily rate for two months in 1935 is 109,339 tons, compared with 81,457 tons for the same period of 1934.

The daily rate of both January and February is the highest since second quarter of 1934, when in each of the three months it was slightly higher. All other months of 1934 were well below the levels of this year.

In February this year 51.61 per cent of capacity was engaged, compared with 47.42 per cent in January and 41.31 per cent, February, 1934.

Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 99.32 per cent

	Open Hearth		Bessemer		Total		Calculated daily production, all companies (gross tons)	Number of working days
	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity		
1935								
Jan.	2,594,312	*49.02	239,858	34.99	2,834,170	*47.42	104,969	27
Feb.	2,517,789	53.53	224,336	36.82	2,742,125	51.61	114,255	24
2 mo.	5,112,101	.....	464,194	.....	5,576,295	.....	109,339	51
1934								
Jan.	1,798,698	34.20	172,489	25.17	1,971,187	33.16	73,007	27
Feb.	2,007,287	42.93	175,873	28.87	2,183,160	41.31	90,965	24
2 mo.	3,805,985	.....	348,362	.....	4,154,347	.....	81,457	51
Mar.	2,557,534	48.63	203,904	29.75	2,761,438	46.45	102,275	27
Apr.	2,640,326	54.22	257,482	40.57	2,897,808	52.64	115,912	25
May	3,021,168	57.44	331,620	48.38	3,352,788	56.40	124,177	27
June	2,733,571	53.97	282,592	42.81	3,016,163	52.68	116,006	26
July	1,352,932	27.73	119,869	18.89	1,472,801	26.76	58,912	25
Aug.	1,253,972	23.84	109,598	15.99	1,363,570	22.94	50,503	27
Sept.	1,134,127	23.29	117,580	18.53	1,251,707	22.74	50,068	25
Oct.	1,334,298	25.37	127,789	18.64	1,462,087	24.59	54,151	27
Nov.	1,457,206	28.77	132,059	20.01	1,589,265	27.76	61,126	26
Dec.	1,810,139	37.17	131,456	20.71	1,941,595	35.27	77,664	25
Total	23,101,258	38.13	2,162,311	27.39	25,263,569	36.89	81,233	311

Capacity percentages for 1935 are based upon open-hearth capacity of 60,954,717 tons and bessemer of 7,895,000 tons on Dec. 31, 1934; for 1934 based on open-hearth capacity of 60,583,813 tons and bessemer of 7,895,000 tons on Dec. 31, 1933

*Revised.

and administering unemployment relief in Illinois.

□ □ □

Russell Gunn has resigned as president of Federal Screw Works, Detroit. He has been succeeded temporarily by M. J. Dunkel, who has been vice president in the Federal Screw Works' division at Chelsea, Mich.

□ □ □

Walter T. Massey, of Dover, Del., has been elected president of the Pennsylvania and Eastern Seaboard Hardware association.

J. T. McCollough, Kittanning, Pa.; E. H. Antrim, Camden, N. J.; and H. W. Sheeler, Red Lion, Pa., were chosen vice presidents.

□ □ □

Ollie Greggs, recently associated with the open-hearth department of the Inland Steel Co., Chicago, has been appointed assistant superintendent of the Lakeside plant of Otis Steel Co., Cleveland. For a number of years he was open-hearth superintendent at the Steubenville, O., plant of Wheeling Steel Corp.

□ □ □

Maj. Frederick H. Payne, assistant secretary of war during the administration of President Hoover, has been elected president of the Greenfield Tap & Die Corp., Greenfield, Mass. He succeeds Charles N. Stoddard, who returns to law practice. Colonel Payne has been chairman of the board of the Greenfield corporation.

□ □ □

Thomas R. Langan has been appointed traffic manager of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. In 1924, he was appointed transportation manager of the northwestern district of the company with headquarters in New York, and in 1931, was appointed sales manager of that district, the position he now leaves to become traffic manager.

□ □ □

Lee B. Landon, former assistant manager of the Elwood, Pa., plant of American Sheet & Tin Plate Co., who as announced in STEEL for Aug. 13, 1934, was transferred to the Gary, Ind., mills of the company as assistant manager, succeeded Thomas O'Brien as manager March 1. Mr. O'Brien, former head of mills in Elwood and Farrell, Pa., has retired on pension.

W. H. Huggus, assistant manager at Gary, has been transferred to Pittsburgh as head of the public relations department of the company.

Granted Drawback on Blades

Drawback has been allowed by the treasury department on hack saw blades manufactured by the Great Neck Saw Manufacturers Inc., Great Neck, N. Y., with the use of imported sheet steel.

Died:

JOHN S. KEEFE, 71, retired president of American Steel & Wire Co., Cleveland, in Oak Park, Ill., March 3. He had been identified with subsidiaries of United States Steel Corp. and predecessor companies for 44 years prior to his retirement Dec. 31, 1932. He was born in Boston and received his early schooling there. From 1880 to 1888 he engaged in railroad work, first as a clerk with the Chicago & North Western and later as general freight agent for the Canada & St. Louis railroad, now a part of the New York Central.

Mr .Keefe entered the steel industry in 1888 when he became associated with the Union Steel Co., Chicago, later merged with Illinois Steel Co. For ten years he was general traffic manager of the Union company and general freight agent for a former subsidiary corporation, the Chicago, Lake Shore & Eastern railroad. Retiring from these positions in 1899, he became general traffic manager for the American Steel & Wire Co. He was made a vice president and director of the latter in 1901 and was elected president in 1927. During his connection with the American Steel & Wire Co. he served as chairman of the traffic committee of the United States Steel Corp. and directed its transportation interests from 1903 to 1928.

John S. Keefe

□ □ □

Leslie J. Gray, 58, assistant to the president of American Steel & Wire Co., Cleveland, in that city, March 3. Born in Chicago, he began work in the offices of Illinois Steel Co. there in 1898. In 1901 he went to Pittsburgh with American Steel & Wire, later becoming assistant to the vice president. He went to Cleveland about eight years ago as assistant to the president, John S. Keefe, and later continued in the same position under C. F. Blackmer.

□ □ □

Peter J. Pauley, 80, president of the Jail Building Co., St. Louis, in that city recently.

□ □ □

Robert R. Fox, 62, who in 1898 organized a branch of the Simonds Saw & Steel Co. at Seattle, in that city, Feb. 26. Identified with the company for 30 years, he became vice president.

□ □ □

R. T. Plummer, 35, mechanical engineer with Pickands, Mather & Co., Duluth, in that city, Feb. 25.

□ □ □

Harry L. Dunn, 50, vice president, Auburn Automobile Co., Auburn, Ind., in that city, March 1.

□ □ □

William Christensen, 60, who operated a fabricating shop under his own name in York, Pa., in that city, March 4.

□ □ □

Morley P. Reynolds, former vice president of the W. S. Tyler Co., Cleveland, in Cleveland Heights, March 5, after a long illness.

□ □ □

George E. Burrows, 75, for many years in the scrap iron and steel business in the Pittsburgh district, in Ford City, Pa. Feb. 28.

□ □ □

Guy H. Billings, 45, assistant general manager and purchasing agent of the Four Wheel Drive Auto Co., in Clintonville, Wis., Feb. 25.

□ □ □

Carlton S. Whitney, 38, president, Dover Stamping & Mfg. Co., Watertown, Mass., in that city, March 6. He was secretary of the Sheet Metal Association of New England.

□ □ □

John W. Boggs, mechanical engineer for many years with subsidiaries of United States Steel Corp. in the Pittsburgh district, in Pittsburgh, March 4, after a two-year illness.

□ □ □

Capt. William E. McKay, 70, retired naval officer and chairman of the board of Mystic Iron Works, with a blast furnace at Everett, Mass., in Boston, March 2. He formerly was president of the New England Fuel & Transportation Co. and was senior vice president of the Massachusetts Gas Co.

□ □ □

Charles A. Jelley, 67, prominently identified with the construction of the Braddock works of Carnegie Steel Co., and early associate of Charles M. Schwab, in Pittsburgh, March 1. In July, 1902, he was employed by Jones & Laughlin Steel Corp., having served there continuously for the past 33 years. In earlier years he assisted in construction of that company's Eliza works, and at the time of his death was bricklaying superintendent.

January Exports Up Third over 1934

EXPORTS of iron and steel products from the United States in January totaled 262,740 gross tons, 7.1 per cent less than in December but 32.1 per cent greater than in January, 1934. Imports of iron and steel products totaled 22,784 gross tons, a rise of 15.6 per cent over December and practically equal to the 22,653 gross tons imported in January, 1934, according to the iron and steel division, department of commerce, Washington.

Decreases in exports included scrap, 16,731 gross tons less, heavy steel rails 6133 tons, tin plate 2368 tons, structural shapes 1178 tons, seamless casing and oil line pipe 1059 tons, and light rails 969 tons. Wire rod exports increased 2819 tons, black sheets 2695 tons and semifinished steel 1442 tons.

Of the scrap exports Japan took 107,604 tons, United Kingdom 21,555 tons, Italy 40,245 tons, Poland and Danzig, 9663 tons and Canada 3921 tons.

Following scrap, second place in volume went to tin plate and taggers' tin and third place to black sheets, with galvanized sheets, steel bars and tin plate scrap following, in the order named. Iron ore exports totaled 1958 tons, all to Canada.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1935		1934	
	Imports	Exports	Imports	Exports
Jan.	22,784	262,740	22,653	178,023
Feb.	.....	.....	25,407	151,184
Mar.	.....	.....	38,393	261,269
April	.....	.....	26,862	201,539
May	.....	.....	29,465	241,753
June	.....	.....	24,848	219,406
July	.....	.....	17,676	233,186
Aug.	.....	.....	32,418	242,947
Sept.	.....	.....	23,847	301,330
Oct.	.....	.....	20,202	220,209
Nov.	.....	.....	35,272	299,263
Dec.	.....	.....	19,708	282,655
Total	.....	.....	316,761	2,832,761

ORIGIN OF JANUARY IMPORTS

Gross Tons

	Pig iron	Manganese ore	Ferromanganese
Sweden	200	.....	.....
United Kingdom	50	.....	237
Canada	929	.....	683
British India	854	186	.....
Soviet Russia in Europe	.....	6,564	.....
Chile	.....	160	.....
Gold Coast	.....	6,038	.....
France	.....	.....	145
Italy	.....	.....	100
Norway	.....	.....	1,426
Netherlands	.....	.....	39
Total	2,033	12,948	2,630

	Sheets, skelp and sawplates	Structural steel	Steel bars	Hoops and bands
United Kingdom	3	.....	40	8
Germany	15	767	13	96
Belgium	301	2,478	1,611	1,695
Switzerland	1	.....	.....	.....
Canada	1	.....	.....	.....
France	.....	324	316	486
Sweden	.....	.....	223	2
Austria	.....	.....	6	.....
Czechoslovakia	.....	.....	1	.....
Total	321	3,569	2,210	2,287

February Pig Iron Output Is Close to Estimate

Actual production of coke pig iron in the United States in February was substantially the same as indicated by preliminary figures published in STEEL last week. These statistics had included producers' estimates of output for the last two or three days of the month. Operating blast furnaces on Feb. 28 stood at a total of 95 instead of 96 as reported.

According to complete reports, total production for February was 1,614,905 gross tons, an increase of 136,462 tons, or 9.25 per cent, over the 1,478,443 tons of January. Average daily production was 57,675 tons, which, compared with the 47,692 tons per day in January, was a gain of 9983 tons or 20.9 per cent.

Of the total production, 1,435,044 tons was of nonmerchant or steel works classification; 179,861 tons was merchant.

The total of 95 furnaces active on Feb. 28 was an increase of 6 over the 89 making iron on Jan. 31. In addition to the February stack changes listed last week, Bethlehem Steel Co. banked its Bethlehem G furnace in Pennsylvania.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

	Jan., 1935	Dec., 1934	Jan., 1934
Pig iron	2,033	3,642	11,886
Sponge iron	257	102	45
Ferromanganese and spiegeleisen (1)	2,630	3,534	1,413
Ferrochrome (2)	.....	.....	1
Ferrosilicon (3)	213	274	35
Other ferroalloys (4)	1	.....	.....
Scrap	2,415	4,489	1,160
Steel ingots, blooms, etc.	99	312	54
Concrete bars	109	37	46
Hollow bar, drill steel	50	59	61
Merchant steel bars	2,210	1,443	1,033
Iron slabs	.....	.....	1
Iron bars	58	88	46
Wire rods	775	962	747
Boiler and other plate	10	38	17
Sheets, skelp, saw plate	321	143	488
Tin plate	4	27	3
Structural shapes	3,569	1,662	1,030
Rails and fastenings	211	50	190
Cast iron pipe, fittings	.....	.....	2
Malleable iron pipe ftgs. (5)	37	.....	.....
Welded pipe	21	74	255
Other pipe	1,669	270	527
Barbed wire	1,684	332	1,549
Round iron, steel wire	415	211	258
Telegraph, telephone wire	.....	3	1
Flat wire, strip steel	112	180	49
Wire rope and strand	193	80	145
Other wire	146	52	2
Cotton ties	80	.....	.....
Other hoops, bands	2,207	1,033	823
Nails, tacks, staples	993	435	605
Bolts, nuts, rivets	36	8	28
Horse and mule shoes	82	49	26
Castings and forgings	144	119	127
Total	22,784	19,708	22,653

(1) Manganese content.
(2) Chrome content.
(3) Silicon content.
(4) Alloy content.
(5) New class. No comparable figures for 1934 and previous years.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

	Jan., 1935	Dec., 1934	Jan., 1934
Pig iron	261	976	326
Ferromanganese, spiegeleisen	3	51	.....
Iron and steel scrap	179,630	*196,361	*87,272
Tin plate scrap	4,209	.....	.....
Waste—waste tin plate	2,273	.....	.....
Ingots, blooms, billets, slabs, sheet bars	3,221	1,679	455
Bars, iron	233	32	112
Bars, steel	4,745	5,538	3,316
Bars, alloy steel	154	248	388
Wire rods	3,279	460	7,011
Boiler plate	44	100	29
Other plate, not fab.	1,933	3,787	2,016
Skelp, iron or steel	373	428	819
Iron sheets, galvanized	99	209	107
Steel sheets, galvanized	5,324	5,659	4,816
Steel sheets, black	12,166	9,471	5,748
Iron sheets, black	401	219	142
Strip steel, cold rolled	1,297	1,781	1,641
Strip steel, hot rolled	1,475	1,747	1,266
Tin plate, taggers' tin	14,954	†17,599	†21,118
Terne plate	282	.....	.....
Water, oil, gas and other tanks, exc. lined	774	1,016	480
Shapes, not fabricated	1,663	2,417	1,143
Shapes, fabricated	1,152	2,330	1,886
Plates, fabricated	42	152	442
Metal lath	15	90	126
Frames, sashes and sheet piling	559	126	198
Rails, 50 pounds	897	7,030	11,871
Rails, under 50 pounds	103	1,072	396
Rail fastenings	303	886	2,812
Switches, frogs, crossgs.	138	137	93
Railroad spikes	232	326	679
Railroad bolts, nuts	42	50	248
Boiler tubes, seamless	792	665	481
Boiler tubes, welded	40	38	17
Casing and oil-line pipe, seamless	2,460	3,519	4,881
Casing and oil-line pipe, welded	1,387	246	693
Seamless black pipe, other than casing, etc.	211	147	212
Malleable iron screwed pipe fittings	269	229	335
Cast iron screwed pipe fittings	178	288	173
Cast iron pressure pipe, fittings	360	431	751
Cast iron soil pipe, fittings	280	1,426	166
Welded black steel pipe	1,788	1,459	1,690
Welded black wrought iron pipe	119	207	58
Welded galv. steel pipe	2,407	1,598	1,966
Welded galv. wrought iron pipe	25	98	86
Riveted iron or steel pipe and fittings	56	36	31
Plain iron, steel wire	1,819	1,432	1,146
Galvanized wire	1,401	1,389	2,372
Barbed wire	2,562	2,680	2,196
Woven wire fencing	162	83	139
Woven wire screen cloth	100	66	36
Wire rope	231	149	284
Other wire and mfrs.	365	338	470
Wire nails	783	1,017	866
Horseshoe nails	74	94	65
Tacks	36	29	30
Other nails, staples	239	259	213
Bolts, machine screws	438	533	424
Iron castings	849	512	613
Steel castings	116	273	93
Car wheels and axles	489	1,043	306
Horseshoes	1	33	22
Iron and steel forgings, n. e. s.	427	361	258
Total gross tons	262,740	282,655	178,023

*Includes tin plate scrap and waste-waste tin plate.
†Includes terne plate.

EDITORIAL

Revival of Interest in Rehabilitation Is Good Sign

ANYONE whose memory can span the hectic events of the past few years will recall the various movements initiated during the depression to revive the equipment industries by emphasizing the advantages of modernizing plant and machinery.

During the Hoover administration several drives were launched to make war on obsolescence. Each attempt was rewarded by sporadic action on the part of a few companies to install some items of badly needed equipment. The most elaborate campaign of this kind, which was carried out under the direction of A. W. Robertson during the latter part of 1932, resulted in the purchase of many millions of dollars worth of machinery and supplies. But it, like the other drives, fell far short of its objective.

The reason for the failures was obvious. Lack of confidence in the business outlook prevented executives from authorizing expenditures for betterments. No one doubted the truth of the arguments put forth in behalf of rehabilitation and modernization. Everyone admitted that a large proportion of existing production and manufacturing equipment was obsolete. Most of the prospective buyers knew that the modern devices would cut costs and would pay for themselves in a relatively short time—providing, of course, that they could be operated at a fair rate of capacity.

Today Sheer Necessity Is Forcing Industry To Hurry Postponed Rehabilitation Work

This was the rub. Few companies could foresee enough prospective business to justify extensive outlays for improved facilities. A few executives, who responded to the entreaties of the campaign workers by buying new equipment, later went through the harrowing experience of watching their purchases collect dust and obsolescence in the dismal atmosphere of an idle shop.

Fortunately the situation is different today. During the past six months interest in the rehabilitation of plant and equipment has been mounting steadily. While much publicity has attended the authorization of large expenditures for finishing mills for the steel industry and certain machine tools and other equipment for the automobile industry, these represent only a fraction of the activity in rehabilitation. A gratifying volume of work of lesser magnitude is current, and its influence is penetrating to remote reaches of the equipment industries.

The inactivity of the depression period has taken a heavy toll in the depreciation of plant and equipment. Units of the metallurgical category, such as blast furnaces, coke ovens, by-product plants, open-hearth furnaces, bessemer converters, heating furnaces, foundry cupolas, gas producers, etc., suffer unduly from extended idleness or sporadic operation. Mechanical equipment such as cranes, charging machines, machine tools, rolling mills, conveyors, molding machines, forging and stamping equipment, etc., has suffered from the general practice of robbing parts from idle units to keep the active ones fit for operation. In the case of practically every type of machinery or equipment, the development of new and improved models has accentuated the degree of obsolescence.

Higher Costs Resulting from NRA Codes Provide Incentive for Modernization

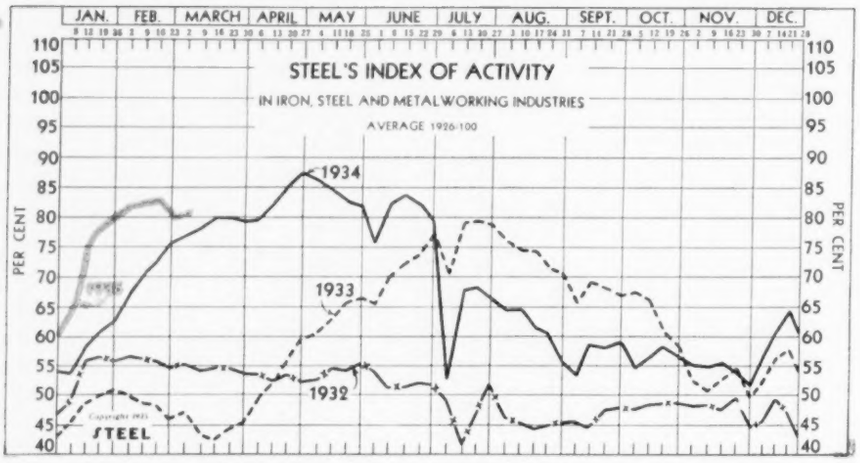
In brief, the cumulative effect of idleness has intensified the problem of rehabilitation. Everything that was true in 1931, or 1932 or 1933, still holds today, but with greater emphasis. Moreover, the actual appearance of, or early prospect of, a fair volume of business makes it imperative for companies to bring their production or manufacturing facilities up to modern standards of efficiency.

But there is still another condition which is decidedly different from those which prevailed when the early modernization campaigns were attempted. The administration's recovery program has reduced hours and increased wages. Production costs have mounted faster than volume of business has increased. The incentives for economy in production and manufacture have been multiplied many fold.

This explains the present concentration of attention upon modernization. The prevailing interest in labor aiding machinery is based on natural, rather than artificial motives.

Every executive in industry recognizes the gratifying implications of this condition. It is the key to long delayed improvement in many branches of the durable goods industries. It is to be hoped that somewhere in Washington there is an influential member of the federal administration who is sufficiently informed to grasp the portent of this development and who will foster and encourage it, rather than combat and retard it.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries gained 0.4 points to 80.9 in the week ending March 2:*

Week ending	1935	1934	1933	1932
Jan. 12	73.8	58.1	48.6	55.8
Jan. 19	78.1	60.9	49.8	56.2
Jan. 26	79.5	62.3	50.8	55.8
Feb. 2	81.8	66.9	49.9	56.2
Feb. 9	82.7	70†7	48.7	56.0
Feb. 16	82.8	72.4	48.3	54.4
Feb. 23	80.5†	75.5	46.0	55.1
Mar. 2	80.9*	76.8	47.4	54.1

†Revised. *Preliminary.

Business Is Fighting Hard To Recover Lost Ground

IN SPITE of an imposing array of bearish factors, industrial activity is making a strong bid for the recovery of ground lost in the last weeks of February.

STEEL's index of activity in the iron, steel and metalworking industries has turned upward from the slight relapse suffered in the week ending Feb. 23. This is due to a continuation of improvement in the volume of automobile assemblies, a gratifying recovery in revenue freight traffic, a slightly higher output of electric power and a smaller drop in steelworks operations.

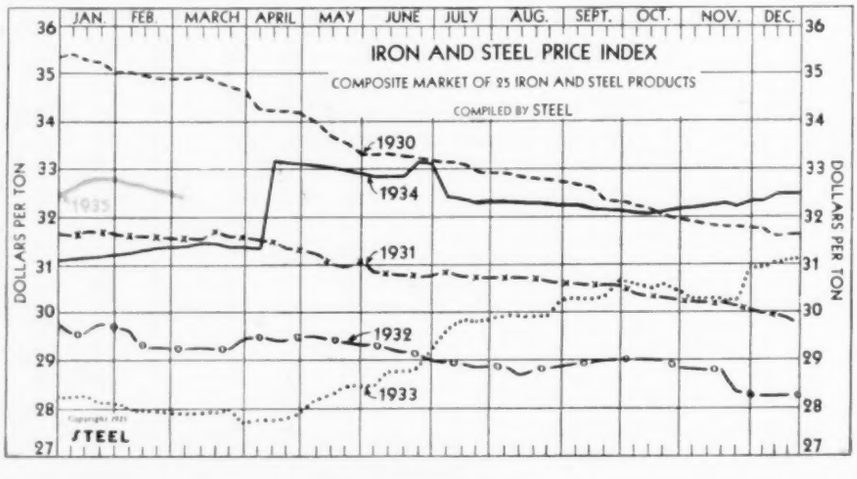
The outlook is more favorable than appears on the surface. Current estimates indicate that the decline in steelmaking has been halted. The likelihood of serious labor trouble in the automobile industry is more remote than it was. The peak in automobile activity still is some weeks, or more, ahead. Brisk demand for agricultural implements and some domestic products such as washing machines is helping to sustain steel consumption. Building construction, while still at low ebb, seems due for a mild improvement soon.

Another favorable factor is the broadening of inquiry and demand for equipment and supplies required for plant expansion and rehabilitation. While attention has been centered chiefly upon several large projects, each involving expenditures of millions of dollars, there is a gratifying volume of modernization work of lesser magnitude. This is tending to create a more evenly balanced condition of activity in the equipment industries than has existed for more than five years.

Can Strength of Business Situation Prevail Against Destructive Political Action?

That business has held its gains of January and early February as well as it has should be evidence of the inherent strength of the present recovery movement. It remains to be seen whether or not this strength is sufficient to offset the adverse effects of the present political mess.

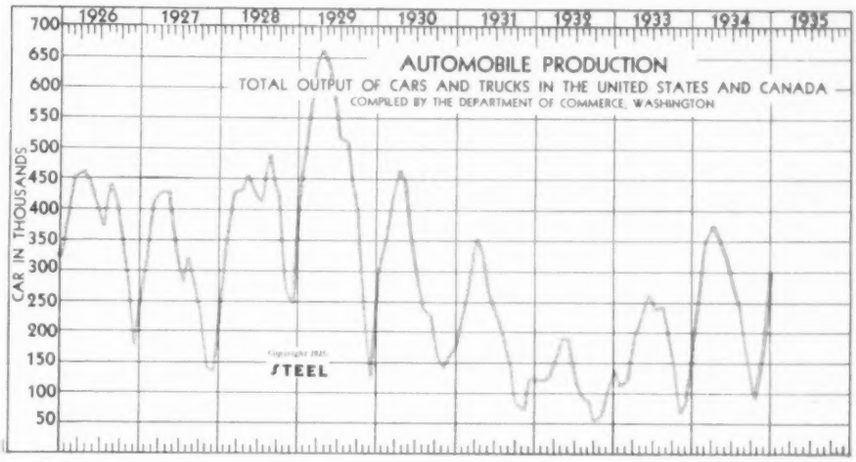
1935	
Mar. 2	$32.42
Feb. 23	32.50
Feb. 16	32.54
Feb. 9	32.56
Feb. 2	32.56
Jan. 26	32.60
Jan. 19	32.62
Jan. 12	32.57
Jan. 5	32.51



1934	
Mar. 3	$31.36
Feb. 24	31.34
Feb. 17	31.33
Feb. 10	31.30
Feb. 3	31.21
Jan. 27	31.20
Jan. 20	31.17
Jan. 13	31.13
Jan. 6	31.10

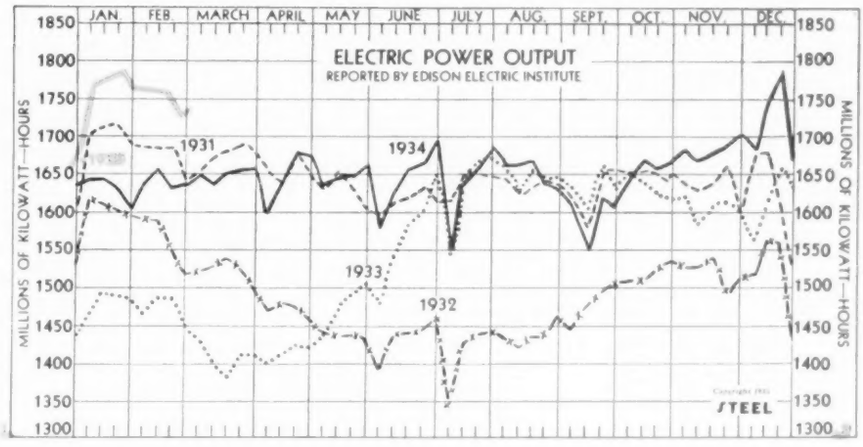
Automobile Production Registers Sharp Gain

	1935	1934
January	303,372	163,811
February		240,278
March		345,443
April		373,108
May		351,813
June		321,970
July		277,690
August		244,714
September		174,450
October		136,271
November		80,162
December		185,919



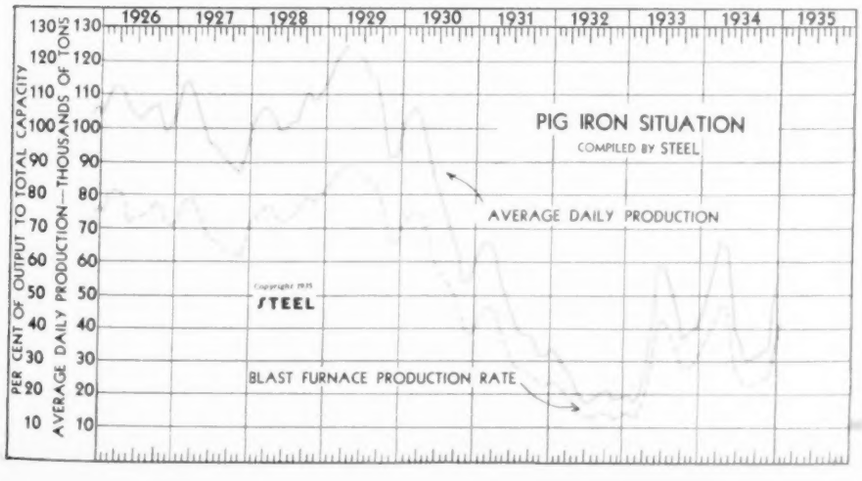
Power Output Holds Margin Over Year Ago

Million Kw.-Hours	
1935	
Mar. 2	1,734
Feb. 23	1,728
Feb. 16	1,760
Feb. 9	1,763
Feb. 2	1,762
Jan. 26	1,781
Jan. 19	1,778
Jan. 12	1,772
Jan. 5	1,668
1934	
Dec. 29	1,650
Dec. 22	1,787
Dec. 15	1,767
Dec. 8	1,748
Dec. 1	1,683



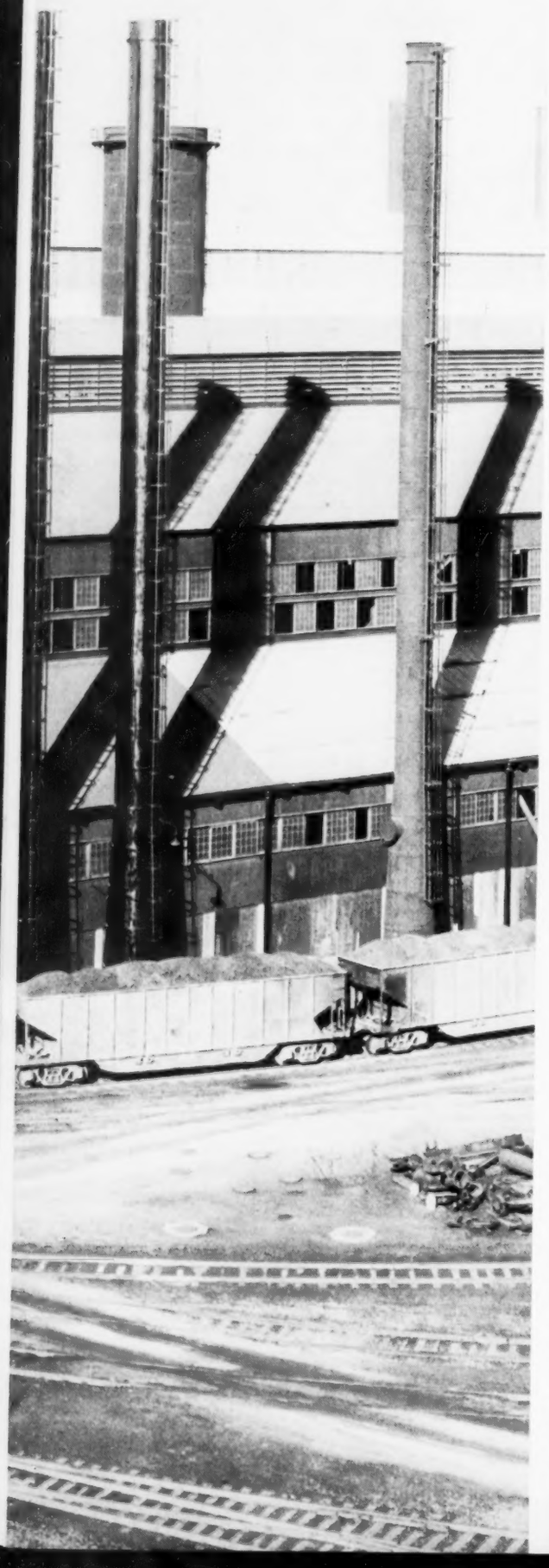
Million Kw.-Hours	
1934	
Mar. 3	1,658
Feb. 24	1,646
Feb. 17	1,640
Feb. 10	1,651
Feb. 3	1,636
Jan. 27	1,610
Jan. 20	1,624
Jan. 13	1,646
Jan. 6	1,563
1933	
Dec. 30	1,539
Dec. 23	1,656
Dec. 16	1,644
Dec. 9	1,619
Dec. 2	1,553

February Iron Output Up 20.9 Per Cent



	Daily Average		Blast Furnace Rate	
	1935	1934	1935	1934
Jan.	47,692	39,537	34.2	28.3
Feb.	57,686	45,385	41.4	32.5
Mar.		52,438		37.5
Apr.		57,873		41.4
May		66,370		47.5
June		64,563		46.3
July		39,630		28.4
Aug.		34,199		24.5
Sept.		29,969		21.5
Oct.		30,689		22.1
Nov.		31,930		22.8
Dec.		33,161		23.7

IMPROVED PAINTS FOR CORROSION



BY JAMES O. HASSON
Industrial Paint Division, Sherwin-Williams Co., Cleveland

ANNUAL toll of rust and corrosion of metals in service has been estimated variously in the neighborhood of $300,000,000 for the world. For the United States, which produces about one-third of the world's supply of metals, the figure would be reduced to about $100,000,000. While this figure is insignificant when stacked up against some of the New Deal billions, nevertheless it represents a loss which might well be studied with a view to its reduction.

Although the chief concern may not be the preservation of a natural resource upon which vast demands are being made, it should be of moment to industry in its fight against corrosion to consider economical and effective means of protecting metals, particularly steel and iron, with the aim of reducing maintenance costs.

Some understanding of the theory of corrosion should make more intelligent any attempt to combat it. Metals occur naturally in an oxidized state—as ores. They are reduced for use by separating out oxygen, water and other substances from the metal proper. The tendency is for metals to revert to the oxidized state, which is, in effect, corrosion. Corrosion proceeds most rapidly in air when heavy moisture is present, and in water when air is present.

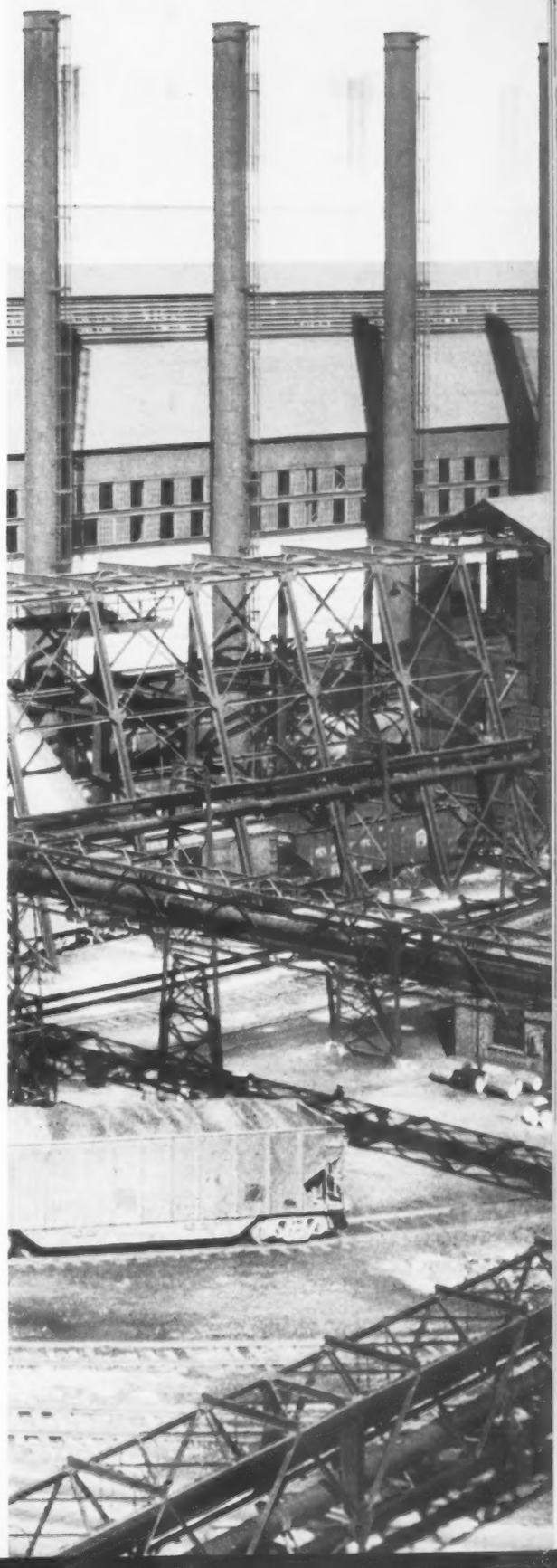
In its simpler forms corrosion is now considered to result from electrolytic action. The concentration of iron rust in spots on the surface results from potentials set up by physical and chemical differences and by stresses on the surface. Varying concentration of oxygen due to the settling of moisture in pores of the metal also effects local attacks of rust.

Ions of metal carrying a charge displace the hydrogen atoms of the water. The oxidized film remaining ceases to protect when it unites with the hydrogen; hydroxide results which may further react with carbon dioxide of the atmosphere to form, in the case of steel, ferric hydroxide and carbonate, known as rust. The reaction set up is more complicated where sulphur fumes, salt and other chemicals are present. The area surrounding the visible rust is generally considered also to develop an alkaline reaction which creeps back between the metal and any protective coating applied. This behavior often may be found on automobile fenders where the paint is loosened over comparatively wide areas surrounding a rust spot.

Corrosion prevention requires making the surface impassive to atmospheric agents. It may be plated with various metals, but once this coating breaks down the iron or steel will rust faster

SPUR ATTACKS ON PROBLEMS

◆ ◆ ◆



than unprotected metal. Plating is also impractical and expensive for large structures and many other applications.

Paint is a practical answer to the problem of rust prevention; but there are a hundred and one conditions to be met and a single type of paint cannot be expected to meet every situation to best advantage. For example, in the coal industry coal dust continually settles on structural surfaces. Since coal contains a trace of sulphur, when moisture collects or rain contacts it a weak solution of sulphuric acid results. That means sure corrosion unless an acid resistant paint is applied.

On and around gas holders, in the oil industry where greases and solvent oils are present, in and about chemical plants, for pipe lines in the steel industry, for piers, for boilers, on power line switching structures and high tension towers, various conditions must be met, requiring paints specifically formulated to withstand existing destructive elements. Tests have shown that paint pigments vary in their anticorrosive qualities, and that some actually tend to increase corrosion. On high tension towers where current leakage apparently increases the electrolytic action responsible for corrosion, a graphite or metallic primer paint never should be used. If any credence is to be given the electrolytic theory of corrosion, certainly only a nonconductive paint should be used for priming. Metallic paints, or graphite, which is used as a film over nonmetal surfaces to be electroplated, are both unsuited as priming paints. If fumes are present, protective paint must be fume resistant.

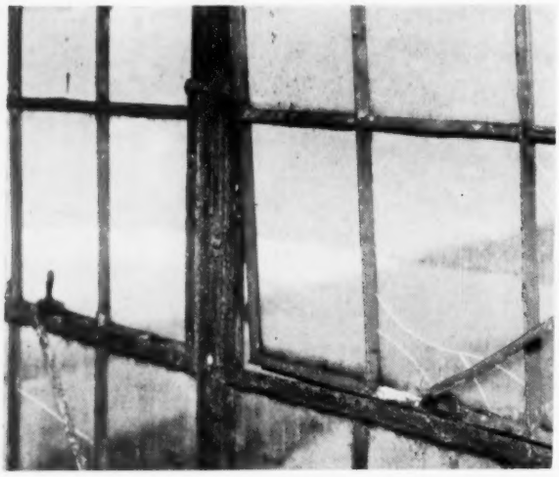
Of the pigments in general use for corrosion inhibiting paints, red lead is one of the oldest and best known. Though satisfactory as a primer, it tends to become too hard and brittle for a finishing coat, and is also fairly expensive. Litharge added up to about 10 per cent is claimed to increase the protective properties of red lead paint. Graphite paints containing sufficient pigment, though suitable for finishing coats, are hardly desirable as primers.

From various tests on pigments reported by Henry A. Gardner[1], notably those made at Atlantic City, N. J., American vermillion (basic lead chromate) easily ranks first, and other paints made on chromate bases have made excellent showings. Sublimed blue lead ranks slightly lower. Practical experience has demonstrated the superiority of primers based on lead chromate in particular. Properly made, they are less expensive than good red lead primers. Lead chromate paints also are applied more easily by brush or

[1]Chief of scientific section, Paint Manufacturing Association of United States. Tests were supervised by American Society for Testing Materials.

spray because a better balanced formula is possible with the lighter pigment.

There are other important arguments in their favor. A primer frequently must stand months of weathering before final finishing of the job. Lead chromate primers have an excellent record on this score. They are actually almost as durable and protective as good finishing coats. For this reason they make excellent shop coats. They withstand more abuse in handling and weathering than red lead primers, and good grades are not affected by sulphurous fumes. Because the primer coat is so important, spraying is advised where it is necessary to reach recesses inaccessible or likely to be neglected if brush application is used.



BECAUSE of condensation on window surfaces, paint protection is essential. This window shows futility of painting a surface without first removing all rust and scale. Rust is proceeding rapidly beneath the paint

Furthermore, spray application is usually more economical.

There is some temptation to stress the importance of the paint pigments employed, to the exclusion of a proper consideration of the liquids used in the paint. No matter how valuable, theoretically, any pigment may be, it will fail utterly in metal protective value if the film cracks or becomes porous so as to permit moisture and gases to penetrate through the metal. Such a film may actually promote corrosion.

Linseed oil films may become appreciably porous in paints where the pigments and the constituent elements of the oils and driers have not been carefully balanced. Linseed and other vegetable oils show a strong affinity for water and will take up a surprising amount of it in the first stage of drying unless specially treated. After the film becomes hard and dry, this water evaporates out and, as the film never closes up, there remain voids resulting in a more or less porous condition.

In hastening the drying of the film to carry it past the absorption period as quickly as possible, there is danger of overdoing the job and impairing the life of the paint, inasmuch as the oxidation of a linseed oil film is progressive and continues through the entire life of the paint. By careful blending of linseed oil with fossil resins and tung oil, which is particularly water resistant, a film will result that does not show a tendency to take up water. The dangers to the film from forced drying are avoided in this way.

Finishing paints for applying over priming coats are even more varied in ingredients than most standard primers—the ingredients being determined by the conditions to which the paint is subject, or by specially desired effects. Surface conditions such as those around petroleum fields and refineries, on gas holders in the large industrial centers, in and around chemical and steel plants, and on underground pipe lines, all require special care in the choice of paints for utmost protection against corrosion.

Other factors, such as appearance, method of application, cost of application and cost per gallon also determine the selection of the finish. Since the labor item is the major cost on any paint job, application and permanence should count more than cost per gallon. The labor on a building generally figures 75 to 80 per cent, and on bridges, viaducts and piers it figures 85 to 90 per cent of the total cost. Any attempt to cut maintenance costs should therefore give particular consideration to the ease of application and hiding power.

Of the metal protective paints, good grades of graphite paint have excellent water-shedding properties and are often used as finishing coats over primers of red lead, lead chromate and other types. They are moderate in cost and when properly prepared and applied, possess excellent protective properties. Some makes are available in dark gray, green and brown as well as black. The latter usually contains a higher percentage of graphite. Though sometimes used for both priming and finishing coats, they are only recommended for finishing.

Charcoal-carbon paints are used in preference to the graphite type by some maintenance men, partly because charcoal contains small percentages of alkaline substances which are valuable as rust inhibitors—it being generally conceded that rust is produced only under acid conditions. The pigment is inert and certain finish paints of this type contain up to 90 per cent linseed oil, which makes them somewhat slower in hardening than other types. This paint is suitable on all steel surfaces except those continually submerged in water. In some cases red lead is added to charcoal-carbon paints to improve the hardening, opacity and durability of the film.

Perhaps the steel finishing paint that has most to recommend it and is the nearest to an all-purpose metal protective paint is the combination graphite paint possessing the water shedding properties characteristic of carbon and graphite paints. The pigment content varies somewhat with the different colors. The black contains the largest feasible percentage of graphite and carbon, which fits it eminently as a finishing coat. These pigments show no unfavorable effect on the oil and offer the best possible support to the oil film. Under ordinary painting conditions they stand up remarkably well and are easy to apply.

Heat Reflecting Properties

In the finishing of tanks for gasoline and other volatile products, for gas holders, tank cars and trucks, ships and transformers, the heat reflecting properties of the paint used mean something in dollars and cents. A white surface absorbs the least heat and a black surface absorbs the most.

The case of Piccard's balloon flights shows the effect of color. His first flight was in a black gondola. He nearly sweltered under a temperature of 100 degrees Fahr. The second flight in a white gondola made him suffer from a temperature below freezing. Yet the stratosphere temperature remains constant at -75 degrees Fahr.

Bureau of mines report 3138 shows the effect of paint color in comparative tests during a four and one-half months' period on 12,000-gallon horizontal gasline tanks:

Tank	Evaporation, gals.	Losses, per cent	Loss in gravity, A. P. I.
A—Painted white, with insulated housing	112	1.40	0.45
B—Covered with aluminum foil	170	2.12	0.55
C—Coated with aluminum paint	187	2.34	0.62
D—Painted red	284	3.54	0.89

Further comparative tests on

four 55,000-barrel crude oil storage tanks painted black, red, gray and aluminum, respectively, showed that the evaporation of the black tank was 649 barrels as against 447 barrels for the aluminum painted tank. The saving is approximately 200 barrels per year per 55,000-barrel tank. This saving warrants giving each tank one color coat every year if necessary. Aluminum, white or light tints generally are specified for all storage tanks where it is desirable to keep the temperature down by heat reflection.

From the standpoint of heat radiation, the color and kind of paint used, show marked effects. Aluminum, copper and other metallic paints reduce heat transmission. Zinc and lead paints show practically no loss.

White Lead Attacked

In the painting of storage tanks, gas holders and the like, there are other factors than heat control that must also be considered under usual circumstances. On and around gas holders, paints containing white lead are not suitable because of the attack of sulphuretted hydrogen gas always present in some degree. General practice favors the use of basic zinc oxide pigments for finishing coats because they have permanency and are less expensive than some others available.

Paints for gas holders, storage tanks and tank cars must also be formulated to withstand the abuses of every sort of weather for long periods. Two specifications particularly recommended for this painting work are:

1.

Priming coat—Lead chromate priming paint.
Second coat (first field coat)—Gas proof tank paint, white or slightly tinted.
Third coat—Same as second coat.

2.

Priming coat—Lead chromate priming paint.
Second coat—Exterior aluminum paint.
Third coat—Same as second coat.

Steel and iron surfaces which are exposed to acid or alkali fumes require special anticorrosion treatment. For the priming coat, the lead chromate base primer is generally recommended. Some of the acid and alkali-resistant finishing coats contain phenolic or other synthetic resins which are highly resistant. One satisfactory formula is composed of 51 per cent asphaltic compounds and 49 per cent mineral spirits. Two or more finishing coats of this type are usually recommended, as the corrosive action under these conditions is exceptionally severe.

Stacks, flues, pipes and other superheated surfaces in all cases must be given a coating of special heat-resisting paint. Smoke stack black or outside heat-resisting aluminum paints are both suitable. These paints are formulated to withstand the heat and resist usual fumes and exposure.

Exposed or underground oil, water and gas pipe lines ordinarily are given extra heavy coatings of tar pitch and graphite paints. The priming coat should be made up of a heavy basic coal tar pitch paint. Properly formulated such a paint will dry with a good gloss, and will remain elastic. It is also resistant to both acids and alkali. For the finishing coat a plastic cement coating is advised. An asphaltic compound is used which is intended to be applied to the pipe hot, by pouring on and swabbing.

One other procedure generally followed in good maintenance practice is to mark all exposed pipes for easy identification. Especially is this recommended where numerous pipes carrying oils, chemicals, hot and cold water, steam, other liquids, gas and electric cables are used in a plant. Pipe line enamels in clear brilliant colors designed for this purpose are available.

First Consideration to Surface

Too great emphasis cannot be placed on the importance of proper preparation of the metal surface—especially galvanized metal and rusty surfaces. The paint must be able to bond intimately and firmly with the metal to adhere perfectly. There must be nothing present under the paint film which can possibly promote corrosion.

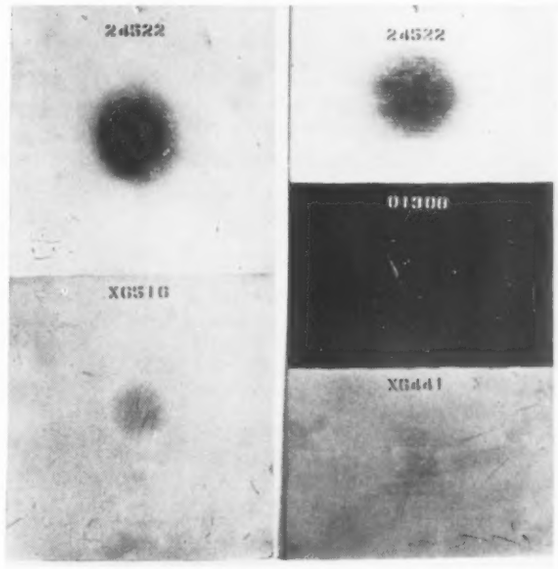
Galvanized iron surfaces, unless weathered, have an oily film to which paint cannot adhere. Evidence of this can be found in many places where the paint literally has dropped off sheds and other galvanized iron covered buildings because the painter failed to heed good paint practice. Etching with an acid solution is sometimes recommended to roughen the surface of new galvanized iron, but this is not required after a few months of exposure to the weather. Such exposure tends to roughen the surface somewhat and foreign matter is usually washed off during this period. Cleaning of new galvanized surfaces is best done with a solution containing 8 ounces of either copper acetate or copper sulphate per gallon of water.

Primer Inhibits Corrosion

One of the best primers for a galvanized surface is a zinc dust-zinc oxide paint. This type of primer is an excellent corrosion inhibitor and helps to maintain a distensible film with excellent adhering and enduring qualities.

It is also important that paint never be applied over rust or over loose, scaly paint. The best and most thorough method for cleaning such surfaces is by the sandblast. This process cleans out rust pits in a most satisfactory manner. Where sandblasting is not available, the surface must be scraped thoroughly, chiseled and wire-brushed. Grease generally is removed by scrubbing the surface with a cloth soaked in a solvent. Naphtha is particularly suitable except where an open flame presents a fire hazard. Without these precautions to clean the surface thoroughly, the paint operation is bound to be unsatisfactory if not, indeed, useless.

There is no one all purpose paint, and the proper selection of a paint means a dollars-and-cents advantage. Too much stress cannot be given the importance of utilizing the services of a good paint manufacturer in analyzing industrial paint requirements.



TEST panels telling the story of paints used in the breeching of stacks where intense heat is encountered. Nos. 24522 and 24522 (right) were painted in aluminum, while No. 01308 was painted in black stack paint. Nos. X6516 and X6441 were painted in high heat resisting gray stack paint. All five panels were allowed to dry and subjected to a red heat, appproximately 1200 degrees Fahr., using a bunsen burner

Replying to Six Pertinent Questions

Questions

1. **In view of the well-known fact that copper and steel have been bright annealed in certain special cases for the past ten years, what are the reasons for the sudden recent activities in this field?**

2. **What is the composition of the new atmosphere? How is it created and what equipment is involved?**

3. **If there are any factors involved in bright heat treating other than the new atmosphere, what are they?**

4. **Is it necessary to vary the composition of the new atmosphere for different applications, and if so, what are the applications and the corresponding atmosphere?**

5. **Where does gas carburizing fit into the controlled atmosphere picture, and what is its present status?**

6. **What are the factors which determine when an industry should use the controlled atmosphere in preference to the conventional direct-fired furnaces?**

Answers

1 Four major factors contribute to the sudden activities in the controlled atmosphere furnaces:

1. The discovery of certain formerly unknown factors affecting the action of furnace atmospheres on metals.

2. Development of a partially combusted gas which will bright anneal and at the same time be safe and economical for large commercial installations.

3. Improved developments of furnace designs which exclude leakage and which permit muffle construction, incorporating conveyors, on a commercial size basis and with medium priced fuels.

4. Realization on the part of industry of the practical benefits and advantages of heat treating without surface change.

Gases previously used, in the cases cited ten years ago, were hydrogen, dissociated ammonia, raw gas conditioned in heated iron filings or coke, and more recently specially prepared gases of hydrogen and nitrogen. All of these gases can be made to oxidize steel and some of them, under certain conditions, will bright anneal or de-oxidize.

The uncertainty of uniform results is an item which caused industry to proceed cautiously in adopting this process. On the other hand, gases containing high percentages of hydrogen are dangerous to handle in large quantities. Also, in fuel-fired furnaces the use of tight muffle construction for long continuous furnaces was not believed practical. In many quarters it still is not held practical, resulting in definite propaganda against the risks and uncertainties of alloy muffles.

About two years ago, we began to immerge from the restrictions of the first three factors mentioned previously. Thereupon, with the ability to control the furnace uniformly; to have an inexpensive, convenient and safe controlled atmosphere; and to obtain practical, rugged furnace construction, the fourth factor, namely, customer acceptance followed quickly and furnace atmosphere control can be expected to be a dominating factor in present and future heat treatment of metals.

* * *

2 A typical analysis of the new atmosphere is the end products resulting from burning six parts of air with one cubic foot of natural gas, the analysis being in the following proportions:

	Per cent
Nitrogen	74
Hydrogen	9.6
CO	8.7
CO_2	5.8
CH_4	1.9
Specific gravity	0.91

This gas will be saturated with water vapor at approximately 135 degrees Fahr. The equipment for generating this gas comprises an insulated lined cylindrical combustion chamber in which a proportioning type of burner supplies the six-to-one mixture with sufficient air to maintain the temperatures necessary for this reaction within the chamber without resorting to any external means of heating. The flue gases thus generated are directed to a water scrubbing tower in which they are washed and dropped to tap water temperature. From there they are conducted to a refrigerator coil which of itself decreases the moisture content to any degree desirable down to approximately 38 degrees Fahr.

* * *

3 A number of factors are involved in bright heat treating other than the new atmosphere. This is best proved by the fact that the same gas can be used to oxidize or deoxidize steel.

Among these other factors involved is the sulphur content in the original gas. Natural gas and some butane and propane usually contain sulphur percentages which are not felt. About two years ago, while running some bright annealing tests on copper, a change was made to manufactured gas and black stains were encountered which would not pickle off. This immediately threw a serious crimp into the bright annealing program as far as manufactured gas was concerned and immediately attention was given to ways and means of overcoming this situation. It was discovered that by putting the gas through a special combustion chamber the sulphur compounds were changed to a form which could be removed easily.

Another factor present in the hardening units which are connected by a sealed chute to the quench is the vapor from the quench bath. Steam from the water quench will poison the atmospheres to the oxidizing side. Oil will not have the oxidizing effect but the piece itself is discolored by the oil during its quenching so little is gained in appearance by bright heat treating prior to quenching.

Other factors involved are more

BY W. M. HEPBURN
Surface Combustion Corp.

on Furnace Atmospheres

CONTROL of furnace atmospheres, while not a new subject, is one which in the last few years has witnessed great strides until today it is a source of considerable discussion and controversy. Some of the fundamental factors involved in so-called bright heat treating are presented in the accompanying article, abstracted from a paper given before a recent meeting of the American Gas association by W. M. Hepburn, vice president in charge of engineering, Surface Combustion Corp., Toledo, O.

or less mechanical. For example, the furnace must be tight. Any flue gas leakage into the muffle or air leakage in from the openings at the end is bound to have a destructive action. It is, therefore, necessary on continous furnaces to use either some sort of vestibule construction or else eductors on the ends and limit the height of the opening. The greater the size of opening the more furnace atmosphere gas will be required.

* * *

4 Gases within the realm of six parts of air to one of natural gas or the equivalent in other gases probably would be suitable for the major applications. There are reasons, however, why the same composition cannot be used as a universal application:

1. To protect high-carbon steel from decarburizing. In this case it is necessary to produce a carburizing gas in equilibrium with the carbon content of steel treated. The six-to-one ratio would be in equilibrium with approximately a 0.40 per cent carbon steel.

2. It is necessary to run lean mixtures for the sulphur ladened manufactured gases. In this case about a nine-to-one ratio is maintained. For brass, where methanol is used, a lean mixture also is used of around nine to one. The analysis of this flue gas is approximately: Nitrogen, 88 per cent; CO_2, 10 per cent; CO, 1 per cent; and hydrogen, 1 per cent.

The addition of methanol, CH_3OH, breaks down at 850 degrees Fahr. and reacts with the above flue gas, the atomic reactions and the products being such as to completely remove the zinc oxides for producing bright brass. This is a deoxidiizing process.

3. To prevent carbon deposition.

* * *

5 At the present time Surface Combustion Corp., has approximately 15 continuous gas carburizing furnaces either in operation or under construction. Laboratory investigations which resulted in the process were started in 1930. A small continuous furnace was built in the laboratory and tests run on various types of materials with natural gas, manufactured gas and butane for a period of three years.

The first installation was at the Chrysler Motor Co.'s plant, Newcastle, Ind., for carburizing steering knuckles and worms. The immediate success of this first job gave this development sufficient impetus to carry it on through a variety of problems awaiting such a development, such, for example, as the use of fuels other than natural gas, combination of heavy tonnage and deep case such as required on plow shares, and bracketing the various catalytic effects of the different chrome-nickel alloy combinations on the gas reactions themselves.

Continuous gas carburizing is essentially an accurate and reliable method, despite the fact that carburizing is not one of the simplest processes. This type of furnace might better be termed an instrument than a furnace. During the 1929 boom days, furnace equipment could be built to dimensional specifications with a guaranty thrown in on the fuel consumption as a final security. The only determination in the performance of the gas carburizer is in the customer's finished product. Automatically the furnace manufacturer is precipitated into the center of the customer's process. Carburizing specifications are based on three distinct conditions, namely, carbon concentration, depth of penetration, and gradation.

Based on Atomic Carbon

Any furnace for carburizing to be commercially practical must be able to control all three of these conditions. The development of this gas process is based on the recognition of the effectiveness of the atomic carbon. It took a lot of courage on the part of the scientists to generate CO_2 and inject it into a carburizing gas, knowing in advance that CO_2 itself has a decarburizing effect on steel. Briefly, the eutectrol process developed by Surface Combustion is based on three successive steps: (1) The carbon deposition zone; (2) the reaction zone in which the carbon so broken down goes through an atomic reaction with a constituent such as CO_2; and (3) an equalization zone in which the carbon is difused through the steel.

All of the above reactions are carried through in a predetermined flow to prevent accumulations which might reverse the sequence of reaction.

At the present time this process is being used in carburizing various automotive parts, such as worms, gears, front wheel driveshafts, camshafts, pineapples, plow shares and roller bearing parts. The lowest case required is on some of the automobile parts, around 0.035-inch, camshafts around 0.075-inch and plow shares from 0.080 to 0.090-inch. The carburizing is carried on at the rate of penetration of 0.010-inch per hour. When manufactured gas is the gaseous medium, it is enriched with about a one to seven mixture with butane and propane. With natural gas as a fuel, the reformed gas has a ratio of about five parts of air to one of gas. This is enriched with a certain percentage of natural gas.

Where butane is used, a generator is utilized to generate the base gas; this type is enriched with about a one to seven ratio of the same gas. The process is carried out in a full muffle furnace equipped with alloy valves at either end. A specially designed valve has been worked out which will maintain a pressure within the muffle. The work itself is put through on trays of a special design to fit the particular type of work.

* * *

6 Value of any process or equipment must be expressed ultimately in the cost to produce per unit quantity of work. The value of controlled atmosphere furnaces to industry and the factors which determine their decision are in the embryo or making today. In various industries, the deciding factors in making this determination will vary. In some industries operating costs are of first consideration and in other industries the quality of product, and in still other industries the sales appeal or merchandising value that can be

gained from the use of atmosphere units.

The last nine years' experience has taught industry that in the modern direct-fired type of furnace it is possible to accomplish lower operating costs and a quality of product that prior to the development of this furnace was thought impossible. By controlling the atmosphere in a direct-fired furnace, by allowing the proper time temperature cycle, by the building of an alloy machine within a brick casing and by the proper application of heat, manufacturing costs were reduced and industry found that it was not necessary to provide as wide a limit of machine tolerances, or machine operations in respect to the amount of material to be finished from the heat treated stock as before.

It has been too often the case where equipment is purchased without regard to fixed charges and perhaps using a figure for operating costs which does not present figures based upon either scientific design or actual operating data for similar equipment, that the actual costs determined after the equipment has been placed in operation were far in excess of the anticipated costs.

The initial cost of equipment does not warrant the attention it usually receives. Before modern design had changed the furnace situation from purely an assembly of raw materials into a machine representing scientific design, the question of first cost was of necessity the factor for rating the desirability of any proposition.

With the increase of furnace efficiencies and the introduction of construction features which reduce the maintenance to a small item, the importance of first cost becomes secondary and the real factors to be considered are operating costs plus the fixed charges distributed over the products or the total cost to produce a unit of heat treated material.

This total cost must take into consideration all factors represented by the investment, the performance of the furnace and the quality of the product. Increasing competition among manufacturers is placing a constant pressure on the manufacturing department for better quality of product at a lower cost. Solution to this problem where methods of manufacture or standards of inspection are involved is more and more being reflected in the heat treating department requirements.

The controlled atmosphere process heat treating machine becomes, therefore, a matter of critical investigation and the standards which had to be met in the past now become obsolete. While it is true temperature distribution, rate of heat input, methods of handling material mechanically, methods to insure duplication of operating conditions independent of the skill of the furnace operator, freedom from maintenance trouble, type of fuel and fuel costs still are items of importance, affecting a decision in this class of equipment, the controlled atmosphere process heat treating machine necessitates investigation into manufacturing departments that were in the past considered separate and distinct from the heat treating department, in order to determine the savings possible.

Seek Proper Fields

In the automotive and allied industries, investigations are being made into the value of controlled atmosphere process heat-treating machines to determine the value of controlled atmosphere units in:

1. Partial or total elimination of pickling and sandblasting.

2. Elimination of decarburized material.

3. Lower inventory in respect to material in process.

4. Ability to machine to closer limits.

5. Ability to machine and grind to final size, eliminating a final machine operation.

6. Elimination of acid embrittlement, aside from the saving that can be made from the partial or total elimination of pickling.

7. Decreased inspection costs due to an inspection of material after final grind but before heat treatment.

8. Saving in heat treating costs due to inspection, permitting rejection of material with surface imperfections which ordinarily would not show up until after heat treatment and final grinding operation.

9. Promoting cleanliness, improving working conditions and saving in floor space.

Dieselization of Railroads Would Stimulate Business

To the Editor:

An important phase of the recent trend toward radically changed design of railroad equipment is the increased use of diesel-electric locomotives. Emphasis has been given to this trend by the development of high speed diesel-electric streamline trains such as the Burlington Zephyr.

The trend dates back some five years when diesel-electric switching locomotives first were built and placed in service. A number of locomotives of this type have been installed since, including three by the Burlington railroad during 1934, for terminal and other switching work. These units operate with such economy that they are expected to pay for themselves in three years if operated continuously on 24-hour shifts. In addition to lower operating costs, they show an availability of about twice that of the customary steam locomotive.

These developments are regarded by some as forerunners of the eventual dieselization of the railroads, with diesel-electric locomotives pulling the light weight freight and passenger equipment of the future.

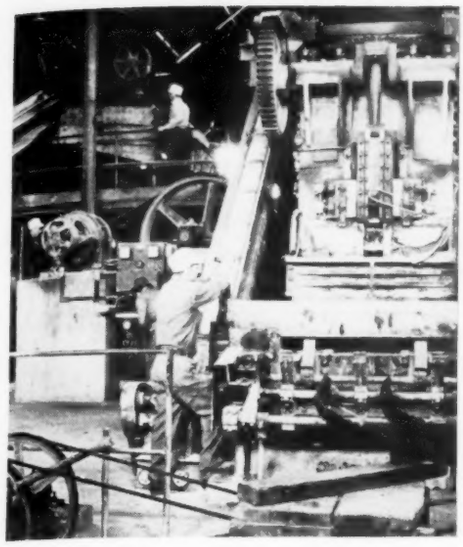
But they have a significance for the immediate present which is not yet generally recognized. That is, such units can be constructed in sizes to pull the heavy freight and passenger trains of the present day, at higher speeds and at lower cost. Large diesel-electric units operating at low costs, will make it possible for the railroads to compensate for inability at the present time to equip with light weight cars exclusively.

The minimum size locomotive for switching is approximately the present 65-ton unit, with 500 to 600 horsepower. The next size might be 100 tons, with 800 to 1000 horsepower; the next 125 to 135 tons, with 1000 to 1600 horsepower. For branch-line work 100-ton units with 1000 to 1500 horsepower and geared for speeds up to 50 miles per hour, would be required. For main-line service, 200 to 300-ton locomotives, with 4000 to 6000 horsepower and speeds up to 100 miles per hour, would take care of the heavy trains of the present day.

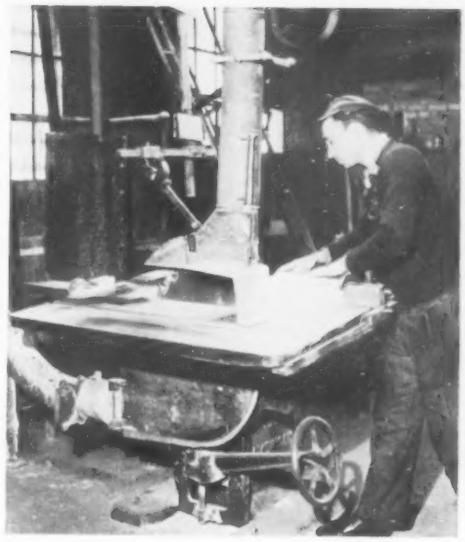
Diesel-electric switching locomotives for regular present-day equipment, and diesel-electric locomotives for hauling light weight, streamline trains, represent a development that is progressing of its own momentum because of the economic and advertising factors involved. But it is one that would be hastened materially, with savings to the railroads, if the roads were permitted to spend some money to help develop larger diesel-electric locomotives. The only matter involved is one of good design and good materials for the larger units. There are no untried principles involved and the question is one of enlarging and perfecting what already has been done.

Dieselization of the railroads on a large scale at the present time would assist greatly the process of recovery, and particularly in the so-called capital goods industries. A 100-ton locomotive, for instance, represents 100 tons of materials and parts whose manufacture entails many work hours. Purchase of such equipment would prove economical for the roads due to the fact that these locomotives are self liquidating.

F. B. Yingling, President,
Mid-West Locomotive Works,
Hamilton, O.



PRESS room (left), showing mixing machinery in the background and in the foreground one of the heavy presses used in forming insulating brick. At the right is shown a cutting table for handling special shapes. Various types of cutting wheels are used and precision sizing is adhered to on all dimensions cut. The operator is making a preliminary setup and locating the guide before making the cut



Forming and Firing Light Refractory Insulating Brick

BY T. E. WOOD, Manager, Industrial Department,
Manufacturers Light & Heat Co., Pittsburgh

REFRACTORY insulating brick, now available from a number of sources, are claimed to effect savings in fuel and heating time, and to facilitate heat control by reducing heat losses through conduction and radiation in furnaces some 60 to 70 per cent. These economies result not only from the low thermal conductivity of the semirefractory materials but also from their light weight which accounts for a low heat capacity.

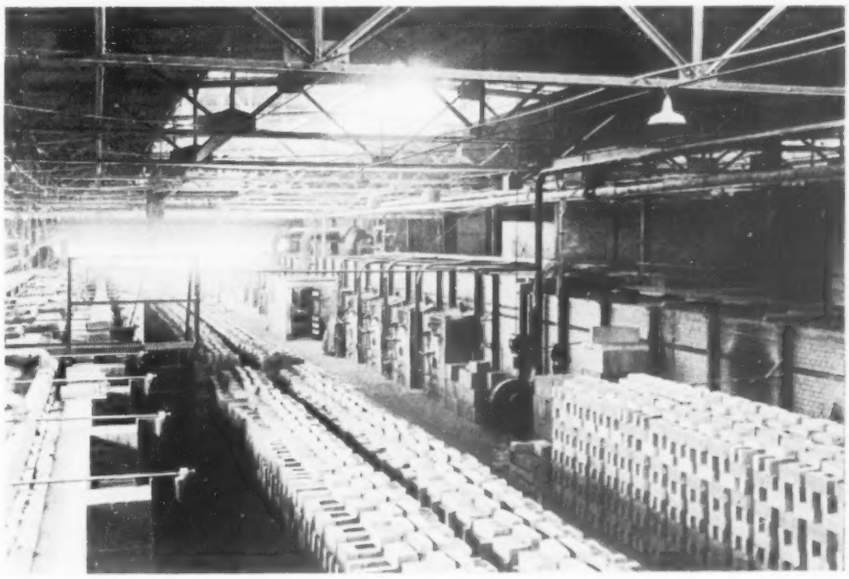
High-temperature insulation and semirefractory products are manufactured in large quantities at the plant of the Armstrong Cork Products Co. at Beaver Falls, Pa. One of the ingredients used in the manufacture of insulating brick is diatomaceous earth, a light cellular mineral that has low heat conductivity. Pulverized and mixed with ground cork and clay, this earth is molded into brick and fired in a kiln. The cork is burned out, leaving additional air cells that help to increase the insulating qualities.

Produced in Three Grades

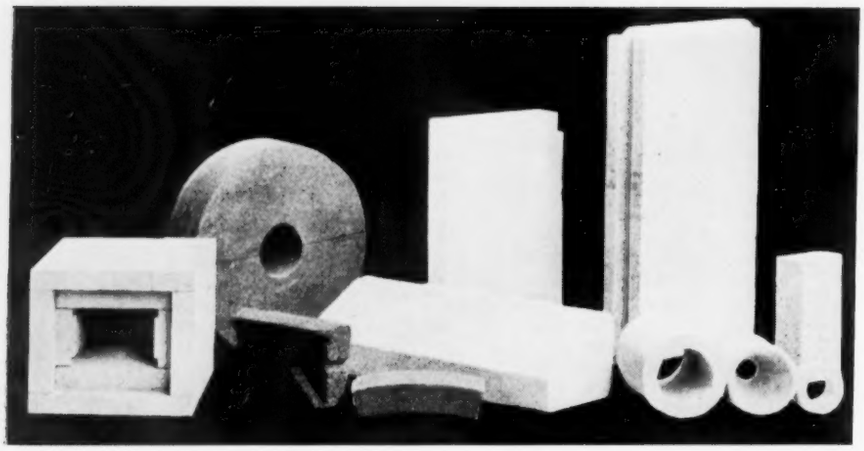
This company produces three insulating brick: Nonpareil brick, used at temperatures up to 1600 degrees Fahr.; Armstrong's brick, for temperatures up to 2500 degrees Fahr. and EF brick, a material especially developed for direct exposure in furnace atmospheres, provided no mechanical abrasion or direct flame impingement is present.

In fact, none of the porous types of brick can be used where exposed to abrasion, slagging action or flame impingement. However, where an abrasive combustion cannot be avoided, a facing material can be applied that will withstand the direct force of the flame.

Nonpareil insulating brick are reported to have ample structural strength for weights and stresses ordinarily encountered in furnace construction. Crushing strength exceeds 200 pounds per square inch at temperatures up to 1600 degrees Fahr. and the brick will not shrink, crack, spall or fuse at this temperature when used back of a suitable thickness of refractory. A standard straight 9 x 4½ x 2½ inch brick of this type weighs 1.8 pounds. Its use is said to result in a saving of from 60 to 70 per cent of the heat loss as against uninsulated construction. Among the more common applications are: Heat treating and annealing furnaces and ovens; bake ovens, core ovens, enameling and japanning ovens; blast furnace stoves in cooler zones; gas benches, kilns, lehrs and regenerators. These brick are laid as part of the masonry construction. Where heavy walls are required for structural strength



General view of kiln room, showing two specially designed gas-fired tunnel kilns used for firing insulating brick



Some refractory shapes which have been supplied at various times. The brick at the extreme right is the standard 9 x 4½ x 2½-inch size

or heat storage, they displace an equal number of second quality firebrick or common brick.

Armstrong's insulating brick have the same structural strength as the Nonpareil but can be used at temperatures up to 2500 degrees Fahr. Weight is 2.25 pounds each. Primarily an insulating brick, they are designed to back up the refractory.

The EF insulating brick have greater strength than those described at temperatures from 1600 to 2500 degrees Fahr. and weigh 2.75 pounds for 9-inch straights. They vary from the others in that no firebrick protection is necessary except where an abrasive combustion cannot be avoided and in this case a facing material is provided to withstand the direct force of the flame. A 9-inch wall of EF brick has about the same heat resistance as 22½ inches of firebrick and 2½ inches of ordinary insulating brick with practically the same heat loss through the furnace walls. The heat capacity, however, is in proportion to the weight of the two structures, the heat capacity of the EF brick furnace being approximately one sixth that of the heavier firebrick and insulating brick type. Furthermore, the EF brick construction permits greater furnace production due to greater hearth area for the same outside dimensions.

Wide Variety of Shapes

All these brick are made in refractory shapes and sizes, and special shapes are supplied up to 288 square inches, 4½ inches thick on specifications. A special engineering service for customers is maintained by this company which supplies information on types of insulation, wall sections, temperature limits and other special problems involved in the design of high-temperature equipment.

Insulating brick are made by the soft mud process which consists of mixing the materials with water to obtain the correct plasticity, filling multicavity molds with this mixture and subjecting it to high pressure in heavy presses. The molds are moved out of the presses and mechanically upset so that the brick and shapes fall on traveling belt conveyors which take them to the dryers. The latter are long rooms with tiers of shelves on both sides and a conveyor in the center. Operators remove the brick and pile them on the shelves where they are dried with heat from steam coils.

Fired in Tunnel Kilns

Large special shapes are molded by hand. Firing is accomplished in one of two gas-fired kilns, each 300 feet long. These are parallel, with three loading and unloading tracks between, and transfer tracks at each end by which the cars are transferred to and from the kiln tracks. Cars are pushed through the kilns by mechanical pushers. Heat is supplied to each kiln by eight gas burners, four on each side, and as there is no muffle, combustion takes place directly within the kiln.

Nozzle mixing burners are employed, air being supplied by a motor-driven blower through one pipe and gas through another, both of which terminate in the burner. Orifices are set in a ratio of 10 to 1 and the gas and air pressures always are maintained at the same pressure by a zero governor in the gas line and a by-pass from the air line.

Fluctuations in the air pressure by turndown or otherwise are reproduced instantly in the gas line and this system permits a single valve control, in this case, a blast gate valve in the air line.

Machining to size is an important phase of production here and the tolerance is held to 0.01-inch. When the brick are fired they acquire a slight bow and correcting this is the first machining operation, accomplished in grinders with emery and carborundum wheels.

The company manufactures and stocks a large number of special sizes and shapes. In making up many of these a standard size, 24 x 12 x 4½ inches, is produced and then cut to specifications with circular and band saws and disk grinders. Standard sizes for skewbacks, circular crowns and the like are made in this way. Frequently, this entails special service. For instance, given the span and rise of a special arch, the engineering department works out the dimensions of the individual blocks and these are cut and machined to size. Adjustable saw tables are provided for a wide range of tapers and heights. Shapes for suspension are drilled for pins and are used for placing a flat arch where furnace conditions permit.

Will Install Steel Bottom In Hot Blast Stove

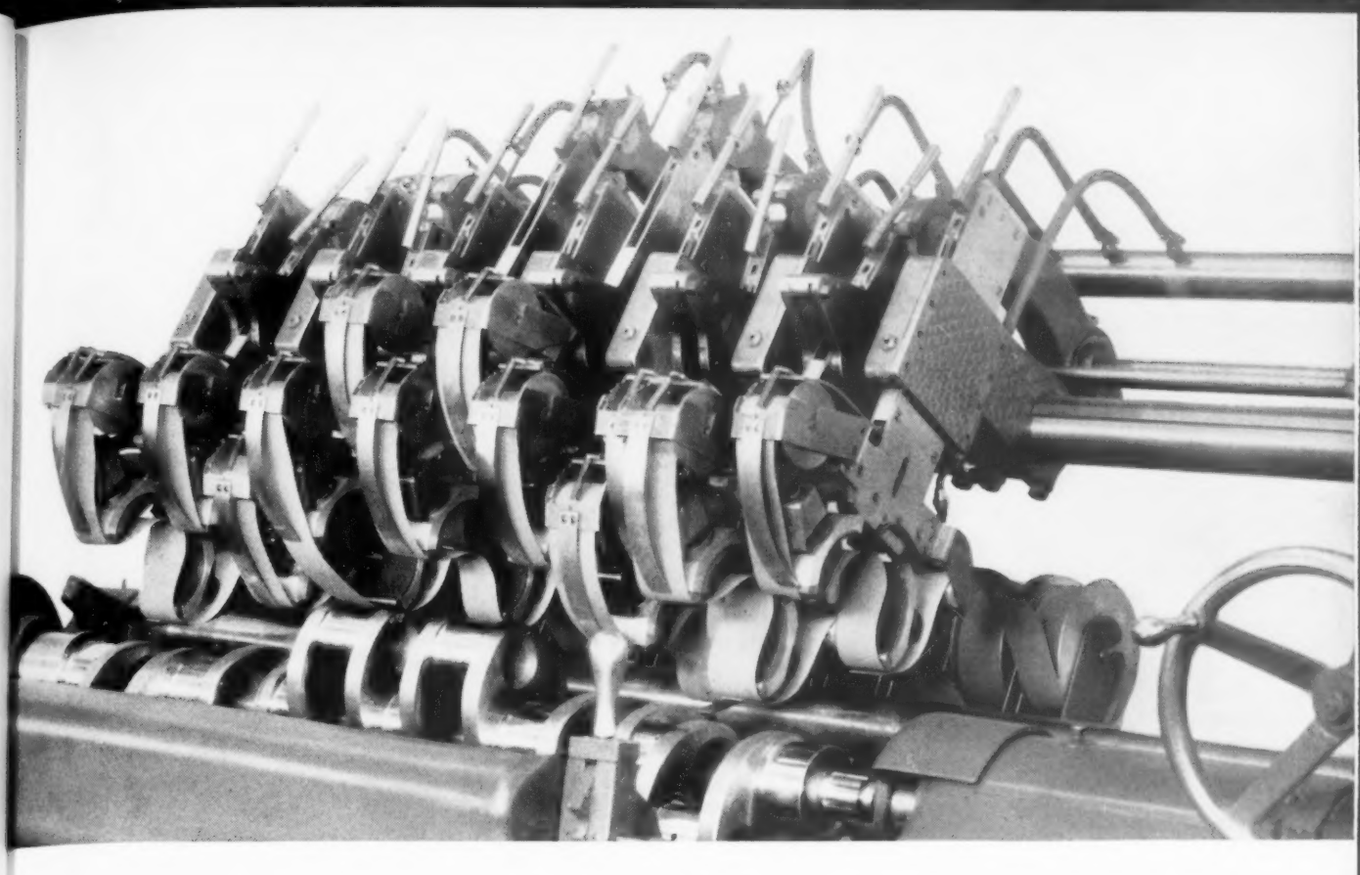
Checkerwork in a third hot blast stove serving a blast furnace at the Steubenville division of the Wheeling Steel Corp. will be supported by a steel bottom furnished by the William M. Bailey Co., Pittsburgh. The new bottom, which will be a duplicate of the two recently installed at this plant, will carry the 3-inch checker load independent of the other parts of the stove and every member of the bottom will be free to expand and contract independent of every other member. A cross section of this newly developed bottom was presented in STEEL for Jan. 21, page 36. The checkers will afford a heating surface of 100,000 square feet.

British Mechanical Year Book Stresses Compression

Mechanical World Year Book, 1935, cloth, 360 pages, 4 x 6 inches; published by Emmott & Co., Manchester, Eng.; supplied by STEEL, Cleveland; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

The forty-eighth year of this publication follows its previous form, with the addition of two new sections to keep pace with progress in mechanics. One section is devoted to high-pressure technique and the other to continuous processes. Compressors are treated particularly from the viewpoint of general application and pumps on selection of proper types.

The plan is being followed of publishing some sections in alternate editions, allowing two consecutive issues to cover a much wider field than any single edition.



CORRECT LUBRICATION

Everything's GOT TO BE RIGHT... *on the* LAST LAP!

. . . An *Interesting Paper has been prepared on Lubrication in Honing and Lapping Operations* . . .

Finishes once considered unattainable are now a routine production standard. Modern honing and lapping operations which make such finishes possible require, however, extra care in the selection and application of fluids.

Fluids must be light enough to keep the abrasive stones or paper clean, but when too light are apt to cause considerable discomfort to operators' hands. Rust prevention is another factor which must be carefully considered in these final, finishing operations.

The Engineering Department of the Standard Oil Company (Indiana) has outlined a number of helpful suggestions in a practical paper just prepared. Standard Lubrication Engineers, specializing in metal working problems, are also ready to help with on-the-ground services at any time.

Specific lubrication requirements in honing and lapping are discussed and many practical hints set down in the monograph pictured here. The coupon below will bring you a copy of this paper.

STANDARD OIL C[illegible]Y (INDIANA)

A practical discussion of the lubricating problems met in gear cutting operations is also available, as well as similar papers on other groups of problems met in metal working operations. Check those listed on the attached coupon and write for information on other subjects in which you are interested.

Standard Oil Company
(Indiana)
910 S. Michigan Ave., Chicago, Ill.

Gentlemen: Please send the papers checked: 48

- ☐ "Lubrication in Honing and Lapping Operations."
- ☐ "Lubrication in Gear Cutting Operations."
- ☐ "The Lubrication Engineer—His Value to You."

Name ..... *Position* .....

Firm .....

Address .....

City ..... *State* .....

Machines Built for Quantity Production of Ice Ribbons

DEVELOPMENT of a new type of machine for the quantity production of ice ribbons, known commercially as FlakIce, is pointing the way to a market for a considerable amount of steel, including stainless, for many of the parts and elements of the new device. Machines having a capacity of 10 tons of ice ribbons every 24 hours require about 6000 pounds of steel each. Smaller machines, 3 and 5-ton units, account for proportionately smaller amounts.

The machines are being manufactured exclusively by the York Ice Machinery Corp., York, Pa., also national distributor for industrial applications.

Cylinder Filled With Brine

The machine comprises essentially an insulated horizontal cylindrical tank within which is a hollow drum, or spider, attached to which are slides and rollers; on the latter the flexible cylinders comprising the heat transfer surfaces are guided. The cylinders, two in number, are firmly bound by wires to rotating geared end bells at one end of each, and to a spacer supporting a gear at the other end, so that the cylinder is constantly rotating, and slightly changing its outline as it passes over the deflecting roller at the top of the machine.

The interior of the flexible cylinder is filled with cold brine, constantly being replenished and agitated by incoming brine flowing through noncorrosive metal nozzles, passing through the internal drum, and along the interior surface of the flexible cylinders and thence out the machine.

A relatively small amount of water to be frozen is maintained between the exterior surface of the flexible cylinder and the interior surface of the insulated cylindrical tank, and at a level just below the top of the flexible cylinder. Upon entering the water, a portion of the cylinder instantly freezes a film of ice upon its surface, which grows as the cylinder nearly completes its revolution. The ice reaches the desired thickness, usually ⅛-inch at section of maximum thickness, at the time the cylinder leaves the water, shortly before passing over the deflecting roller. In passing over the latter, the cylinder and the ice separate, the ice leaving the machine in a continuous ribbon of the desired and predetermined dimensions. Normal practice is to have the ribbon about 5½ inches wide by ⅛-inch thick.

As the cylinder rotates that part of the ribbon adjacent to it is subcooled. From the time the ribbon leaves the water level until it peels off the cylinder all heat abstracted from it is for the sole purpose of subcooling the ice.

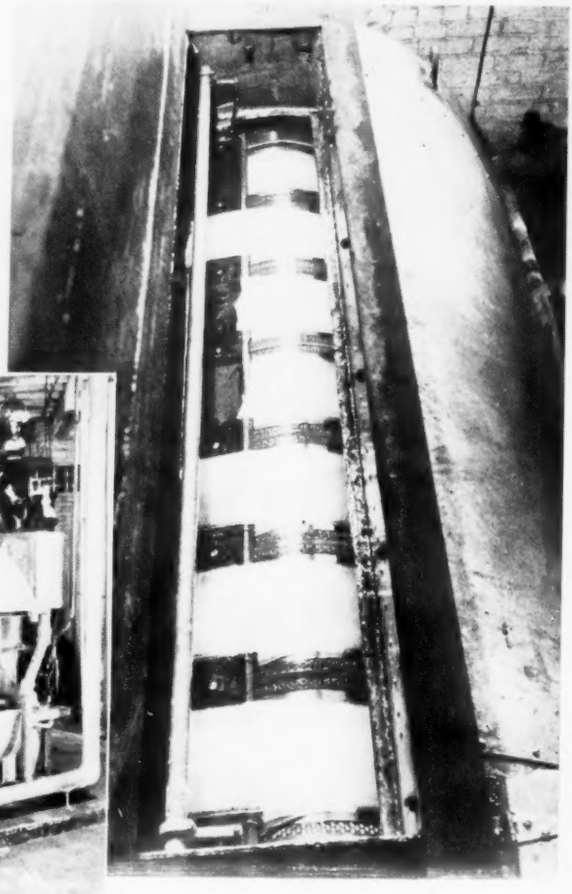
No knives or scrapers are used, the separation being due entirely to the difference in elasticity between the ice and the cylinder to which it is attached while freezing, and the change in shape of the latter in passing over the deflecting roller. This ribbon of pure ice soon breaks of its own weight and as it falls, it breaks up into pieces between 1 and 4 inches long and wide.

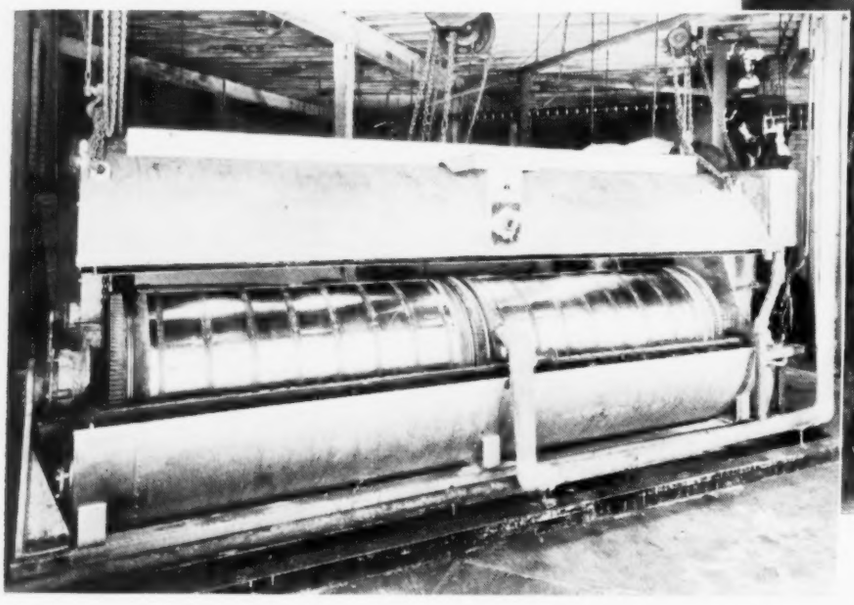
Panels Separated by Rubber

Automatic safety devices are provided so that water supply or power failure, or failure to keep the machine ice exit clear, will result in stopping the machine. The flexible cylinder, of which this machine has two on its single shaft, has seven metal panels separated by rubber strips or bands. For standard purposes the cylinder is made of monel metal and for special purposes it may be made of stainless steel.

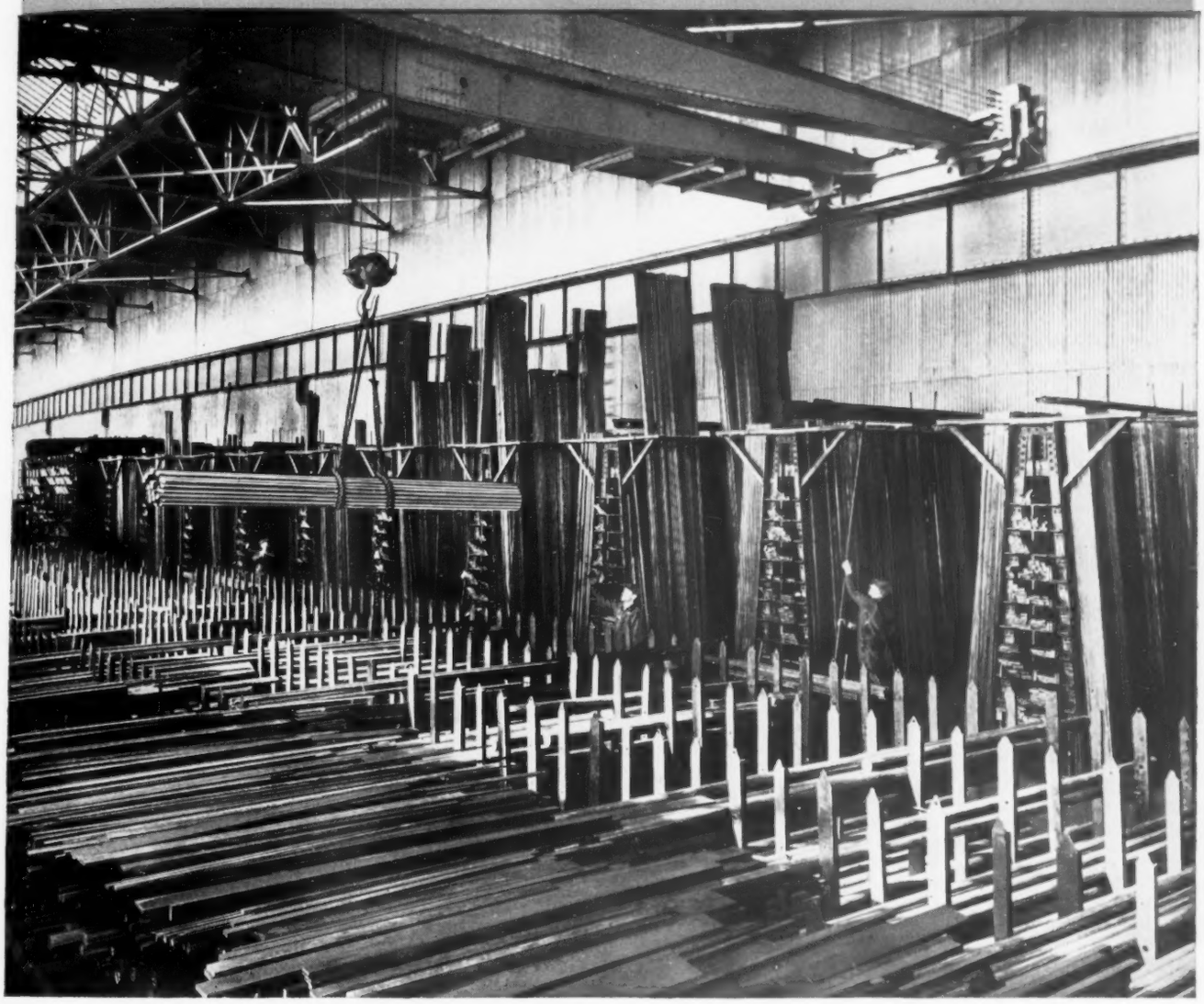
The function of the metal is to

TEN tons of ice ribbons are produced every 24 hours in this new machine which requires about 6000 pounds of steel in its construction. View at the right shows seven ribbons coming off the flexible metal bands on the horizontal cylinder, through which brine circulates. Below is a tandem unit





J&L COLD FINISHED STEEL
from Large Localized Stocks



THE GRADE, FINISH, SHAPE AND QUANTITY YOU WANT

Whether you need a single bar or a large lot, whether you want duplication of previously used stock or the right grade of steel for another use, **J&L** Warehouse stocks of Cold Finished steels will serve you well.

Intelligent handling of orders and prompt shipment add to the value of **J&L** Warehouse service. Use the Combined Stock List for **J&L** Warehouses as a reference and order guide. A copy will be sent on request.

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
JONES & LAUGHLIN BUILDING, PITTSBURGH, PENNSYLVANIA

AND BE SURE . . .

J&L WAREHOUSES

CHICAGO	CINCINNATI	DETROIT	NEW ORLEANS	PITTSBURGH
Virginia 1600	Main 2324	Plaza 0470	Franklin 1131	Hemlock 1000

LOUISVILLE—Magnolia 1693 . . . Stock of Bars for Concrete Reinforcement and Bar Fabricating Yard

MEMPHIS—6-4836 . . . Distributing Warehouse for Pipe, Sheets, Spikes and Wire Products. Reinforcing Bar Warehouse and Fabricating Shop

J&L STEEL

For Every Need . . the Right Quality of Steel in a Full Range of Sizes

provide a quick heat transfer surface on which the ice will freeze. The rubber has a three-fold function. First, it binds the panels into a complete cylinder; second, it provides strips of heat insulation, so that instead of one large sheet of ice, a number of bands of ice each of a more convenient width, are made; and finally, it is made sufficiently thick and tough, so that the thin metal literally rides on a rubber cushion, the latter alone being in contact with the deflecting rollers and guides.

All moving parts of the machine, except the external reducing gears and motor, are brine and water lubricated; hence no oil or grease is used inside the cylinder itself.

The machines have been designed with a view to compactness, and for maximum utilization of space, the 10-ton unit requiring a space 4 feet wide, 15 feet long and 8½ feet high. Weight of a 10-ton machine while making ice, including the brine and water, totals approximately 7½ tons.

Ice made by this continuous, sanitary, mechanical freezing process is claimed to produce low temperatures more quickly and to hold them longer than water ice in any other form. Because they are made under subcooled temperature the flakes have no tendency to freeze together, and their wafer-thin, flat, arched shapes permits over 90 per cent of their surface to come into contact with the medium to be chilled, it is said.

As the machine turns only one revolution in about two minutes, a 10-ton machine requires only ½-horsepower to drive it. The brine pump varies with the layout, but usually a 3-horsepower motor will serve. Therefore, considering the usual compressor efficiencies, sufficient brine cooler surface, and normal water supply and pump equipment, to produce a ton of ice exclusive of the storage bins the following kilowatt hours per ton of ice ribbons may be expected:

Temperature of water being frozen and used for condenser, degrees Fahr.	Approx. kilowatt-hours per ton of ice ribbons
40	37
55	42
65	49
75	59

By certain modifications in design, the machines can be adapted to the manufacture of products other than water ice. Salt ice, for example, has been produced in the form of frozen sodium chloride eutectic ribbons, having a melting point of six degrees below zero Fahr., which has proved of great value on the shipment of frozen foods in refrigerator cars and motor trucks.

New Steel Device Reduces Empty Milk Bottle Loss

Because many customers dislike to pay a bottle deposit when buying milk, grocery and other storekeepers frequently waive the deposit. Resulting loss of bottles has become a serious problem for milk distributors. To eliminate such losses, and at the same time remove the necessity for a bottle deposit, Bottle Savers Inc., Buffalo, has developed a new device which trades a token, such as a stick of gum or a piece of candy for every empty bottle deposited in it. This new device is based largely on the effect of encouraging children to collect empty milk bottles and turn them in for gum or candy.

Made of Autobody Sheets

The shell of the bottle, 57½ inches high and 24 inches in diameter, is made of No. 20 gage auto body sheet steel, stamped in halves and spot welded together, after which apparent imperfections are filled in with solder. The mechanical device which causes the milk bottle to be discharged into the machine for storage, and which causes the gum or other token to be discharged to a point where the operator of the machine can receive it, is assembled into the machine through the top after the shell has been completed, with the exception of a disk at the very top. This disk is split in the middle, one half being permanantly attached, while the other half becomes the door through which the routeman recharges the magazine with a fresh supply of tokens. At the lower back of the shell is a door through which the same routeman takes out the empty bottles which have been returned.

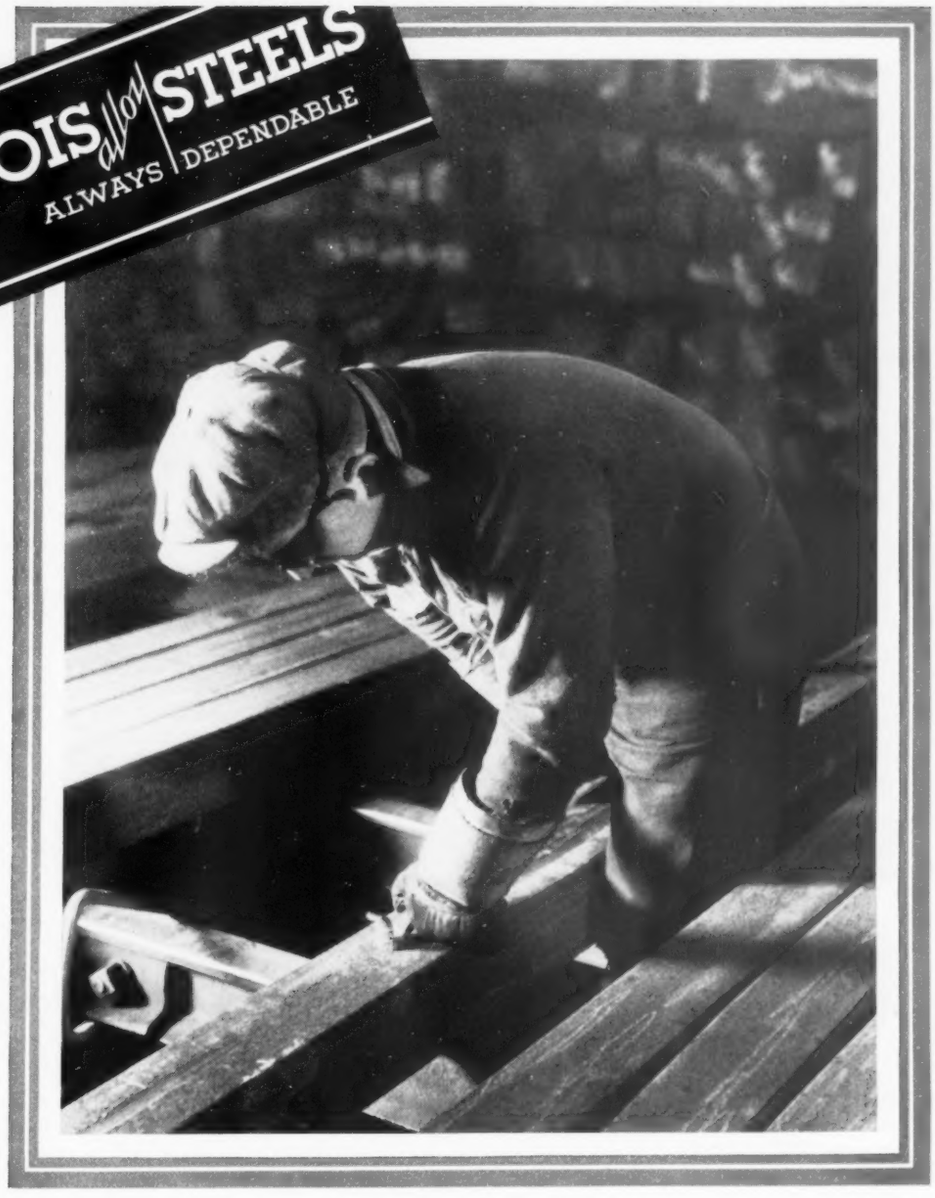
When the milk bottle is discharged from the mechanism from the top of the machine into the bottom of the shell, its fall is checked and retarded on the way by a series of removable and replaceable baffles made of No. 18 gage perforated sheets, edged with rubber channel sections to prevent metal to metal contact, so as to reduce noise to a minimum. Two small steel cylinder locks are used on this machine. The steel parts are finished with sprayed, synthetic, air-drying enamel.

It is stated that typical installations of these bottle savers have resulted in increasing the return of empty milk bottles by more than 100 per cent.

This fabricated steel bottle saver passes out a stick of gum or a piece of candy every time an empty milk bottle is deposited in it, giving children a new employment for their leisure time

Bessemer Aids in Making Strong Low-Carbon Iron

In a prominent Midwest foundry high strength iron with low carbon content is obtained by melting the iron in a cupola, blowing part of the molten metal in a bessemer converter and then adding it to the metal in the ladle. Proportions may be varied to meet special requirements. The usual combination is 60 per cent gray iron and 40 per cent steel from the converter.



HOW AN OUNCE CAN SAVE A TON

● It's only a tiny seam . . . no larger than an eyelash . . . but out it comes before this billet of Illinois Alloy Steel can start through the mill. Every seam, every surface imperfection or irregularity is chipped out of the billets; and every billet is double-checked before going to the re-heating furnace. Thus, a few ounces chipped from a billet here safeguards the quality of the finished bar stock rolled from that billet.

Illinois' alloy mills are operated on the principle that quality in alloy demands the most exacting control of the mechanics of rolling as well as of the metallurgy of the steel itself.

From billet to shipping floor every step is subjected to rigid control and to relentless inspection. The result is an alloy bar free of physical defects or blemishes, straight as a die, finished to save costly operations in your own plant. We know of no mill practice more exacting or carrying greater assurance of quality steel.

ILLINOIS STEEL COMPANY

208 SOUTH LA SALLE STREET, CHICAGO, ILLINOIS

United States Steel Corporation Subsidiary

METHODS AND MATERIALS

Solves Problem of Goggle Wearing

MANY industrial plants experience difficulty in getting workmen to wear goggles and respirators. Discussing this matter in the February *News Letter* of Power Press section, National Safety council, B. A. Grainger, safety engineer, Bendix Products Corp., South Bend, Ind., states that his company employs about 4500 people and is faced with the usual number of complaints that these safety devices do not fit, are too heavy, or cause headaches. On the whole, it is hard to satisfy workers to the extent that they will really want to wear the equipment of their own free will and for their own protection.

Furthermore, the company has found respirators to be in need of repair; fillers are not changed frequently enough and head bands have lost their elasticity, being replaced with string which caused their wearing to be very uncomfortable. To correct this situation, the company constructed a portable repair kit and now a service man makes periodic trips through the plant making repairs and adjustments. After his first trip, this man proved to be a welcome visitor; he has accomplished good work and has solved a difficult problem for the plant management.

The repair outfit is built on wheels and is 36 inches long and 24 inches wide. Inasmuch as the company has standardized on two different makes of optical equipment, repairs for these are carried in a tray which can be placed on top of the truck for easy access or placed inside the inclosure and locked up. Such parts as new lenses, new temples, screws and headbands are very easily replaced. New equipment is furnished if it is needed.

The service man has had special instruction on the proper selection and fitting of protective equipment for the work to be done. The truck, being small, can be moved about close to machines so that the repair man can observe the operator's work and difficulties. To keep the interest of workmen centered on this service, the truck is kept painted a light color and the safety slogan imprinted on it is changed from time to time.

S S S

Copper Addition Increases Strength of Malleable

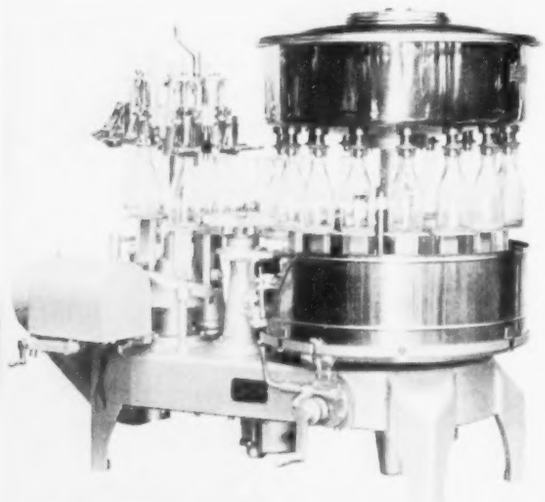
By dilatometric and other methods, the addition of copper has been found to accelerate both first-stage and second-stage graphitization of white cast iron. The effect is roughly proportional to the amount of copper added and 1.00 per cent of copper results in a reduction of graphitization time by about 50 per cent, although this is affected by the rate of heating and other factors. Addition of 1.00 to 1.50 per cent of copper increases the yield point of malleablized iron to the extent of about 10,000 pounds per square inch, and a further gain of 10,000 to 15,000 pounds per square inch can be obtained by subjecting the castings to a precipitation hardening treatment. This consists of heating to a temperature closely below the critical point, air cooling and reheating at about 500 degrees Cent. The increase in tensile strength is accompanied by some loss in ductility.

S S S

Nickel and Monel Resist Dry Cleaning Solvent

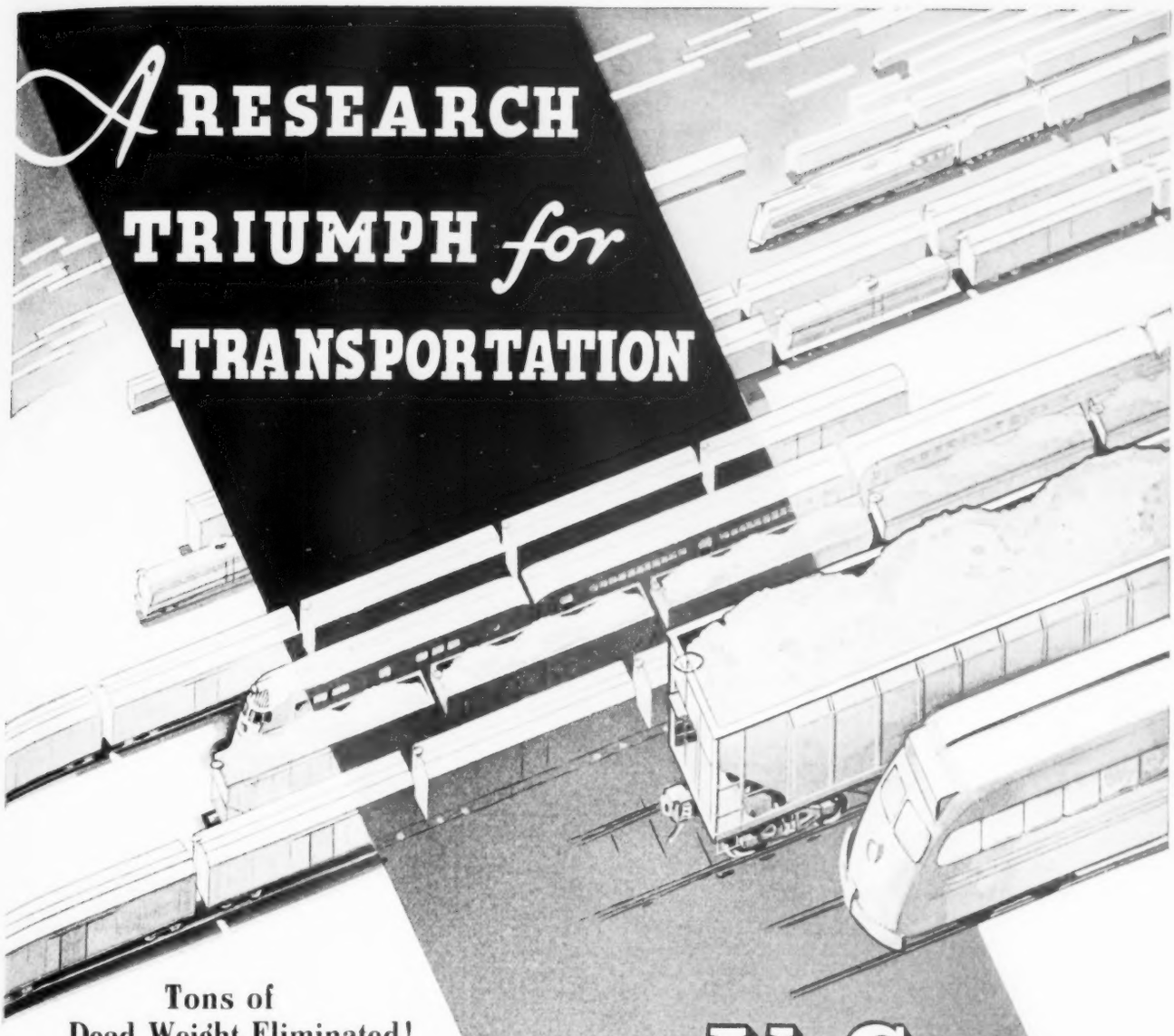
Data from various sources and tests made under actual operating conditions show that both monel metal and pure nickel are practically completely resistant to corrosion by carbon tetrachloride which is reognized as being the most corrosive of the chlorinated solvents in common use. While pure nickel is slightly more resistant to attack than monel metal under most conditions, the rates of corrosion of

For Long Life in Dairies



STAINLESS STEEL USED EXTENSIVELY IN CONSTRUCTING MILK BOTTLE FILLING AND CAPPING MACHINES: One of a new type machine, made in four sizes, designed and manufactured by the Milwaukee division of the Cherry - Burrell Corp., 3002 West Burleigh street, that city. Principal materials of construction are stainless steel sheets, bronze and iron castings

A RESEARCH TRIUMPH for TRANSPORTATION



Tons of Dead Weight Eliminated!

Greater pay-load capacity provided! U S S research has made this practicable through a series of high-strength alloys in which the leading grades are corrosion-resistant U S S COR-TEN, and U S S 18-8 Stainless Steel. Available in the same forms as mild steel, U S S High Tensile Steels have progressively higher physical properties.

USS HIGH-TENSILE STEELS

The atmospheric corrosion resistance of U S S COR-TEN is based upon ACTUAL TESTS extending over a period of years in several different atmospheres. Our statements are based on this actual experience, not upon accelerated or laboratory tests.

U S S High Tensile Steels are supplied in shapes, plates, bars, strip, sheets, rods, wire and wire products, pipe and tubular products. Write for information and literature. Address following manufacturing companies:

AMERICAN SHEET AND TIN PLATE COMPANY, *Pittsburgh* TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
AMERICAN STEEL & WIRE COMPANY, *Chicago* COLUMBIA STEEL COMPANY, *San Francisco*
CARNEGIE STEEL COMPANY, *Pittsburgh* ILLINOIS STEEL COMPANY, *Chicago* NATIONAL TUBE COMPANY, *Pittsburgh*

Pacific Coast Distributors—COLUMBIA STEEL COMPANY, San Francisco, Calif. *Export Distributors*—UNITED STATES STEEL PRODUCTS CO., New York, N. Y.

United States Steel Corporation Subsidiaries

either are so small that either may be used with confidence for all types of equipment. The principal advantage of nickel appears to be in connection with the storage of solvent-water mixtures and to be based on the uniformity of the slight amount of corrosion which may occur.

Results of corrosion tests have been confirmed by the uniformly satisfactory behavior of nickel and monel metal in commercial dry cleaning equipment and solvent recovery apparatus. High-grade dry cleaning equipment employs these two metals.

Similarly, good results are being obtained with these materials in other applications of the chlorinated solvents, such as for example, in the manufacture of cod liver extract using as a solvent ethylene dichloride which is handled and reclaimed by distillation in monel metal equipment. It is also interesting to note that nickel in the form of steam coils for the stills is used in the manufacture of carbon tetrachloride from sulphur chloride and carbon disulphide.

Knowledge of Alloy Systems Is Sketchy, Says Report of Iron Alloys Committee

MUCH of the research for basic facts underlying the many combinations of iron with other elements has been insufficient to clear up all uncertainties and give a firm foundation upon which to build a complete structure of alloy steels. Much of the past research has been unsystematic and some of it unnecessary. So sketchy is our knowledge of some of the alloy systems that a literature survey reveals that the system is mostly gaps.

These are some of the conclusions set forth in the 5-year report of the iron alloys committee of the Engineering Foundation, 29 West Thirty-ninth street, New York, which was submitted at the meeting of the Foundation's board on Feb. 21. This committee, organized by the Foundation in 1929 to conduct an alloys of iron research sponsored by the American Institute of Mining and Metallurgical Engineers, has been reappointed, according to announcement by Alfred D. Flinn, director of the Foundation. The 5-year report is signed by George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., and chairman and director of the iron alloys committee

Commercial Value Cited

"Metallurgical research for basic facts on the alloys of iron does not, usually, have immediate commercial applications, although instances have been known," says the report. "For example, a study of iron-chromium-nickel alloys, a research of apparently academic interest, resulted in the discovery of stainless irons and steels which now are so important commercially.

"Filling the many gaps now present in alloy systems is of utmost importance, not only for the addition to our scientific fundamentals, but also because a more nearly complete basic knowledge of all alloy steels and cast irons will aid greatly in systematizing commercial research, and in eliminating expense for many of the hit-or-miss investigations now so common. Furthermore, there is always the possibility that basic research, either directly or through its by-products, may lead to discoveries or developments of vast commercial importance."

Further Research Outlined

The following are cited by the report as examples of needed basic researches:

"A thorough study of the binary iron-silicon alloys may explain the brittleness of sheet used for electrical machinery;

"A complete knowledge of the constitution of the iron-silicon, iron-manganese, iron-aluminum, and iron-copper alloys may result in the substitution of a cheaper for a more costly alloy;

"A study of alloy equilibria in such a system as iron-nickel may produce, as a by-product, important results in the study of reaction rates;

"Completion of basic data on all of the alloy systems may result in the possibility of accurate predicting of strength properties, thus eliminating costly hit-or-miss testing investigations."

The report recommends a survey of institutions which carry on research in metallurgy, with the object of setting up fellowships to hasten the acquisition of this desired knowledge. A continuation of the work of reviewing the current literature is recommended. It would be of great benefit to the steel and iron producing industry if each of the books published under the authority of the committee could be revised at intervals of 8 to 10 years, or more frequently if the advance of science and technology justified, says the report.

Books already published under the committee's auspices include: Iron-Silicon Alloys Bibliography; Alloys of Iron and Molybdenum; Alloys of Iron and Silicon; Alloys of Iron and Tungsten; Alloys of Iron and Copper. Books now under way and to be published in 1935 and 1936 include: Principles of Phase Diagrams; Alloys of Iron and Carbon; Alloys of Iron and Chromium; Alloys of Iron and Nickel; Alloys of Iron and Vanadium. Books on alloys of iron and manganese and other alloys and on cast iron also are planned.

Extensive Personnel Active

Those active in the work of the iron alloys committee, in addition to Prof. Waterhouse, include: L. J. Briggs and Louis Jordan, national bureau of standards, Washington; John W. Finch and R. S. Dean, United States bureau of mines, Washington; R. E. Kennedy, technical secretary, American Foundrymen's association, and James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala., representing that body; H. W. Gillett, Battelle Memorial institute, Columbus, O.; Bradley Stoughton, Lehigh university, Bethlehem, Pa., representing American Society for Metals; Jerome Strauss, Vanadium Corp. of America, Bridgeville, Pa., representing American Society for Testing Materials; T. H. Wickenden, International Nickel Co., New York, representing Society of Automotive Engineers; James H. Critchett, Union Carbide & Carbon Research Laboratories, Long Island City, representative of the Electrochemical society. Dr. John A. Mathews, vice president, Crucible Steel Co. of America, served as member-at-large on the committee until his death Jan. 11, 1935; his successor has not been appointed.

New Series of Monographs On Lubrication

A lubrication recommendation in a metalworking plant resulted in an increase in the life of drills used in reaming tapered holes in heat treated alloy steel of unusual hardness, with smoother finish of work. A compound of oil and grease made an excellent mixture for polishing cylinders.

These instances and others like them are set forth in a monograph, entitled "The Lubrication Engineer," issued by Standard Oil Co. (Indiana), 910 South Michigan avenue, Chicago. This is the introductory issue of a new series of monographs by that company covering all phases of industrial lubrication. Those now available are "Lubrication of Mine Locomotives," "Lubrication of Beaters and Jordans," "Lubrication of Diesel Air Compressors" and "Diesel Engine Bearing Lubrication." Four or five additional monographs covering lubrication will be issued each month this year.

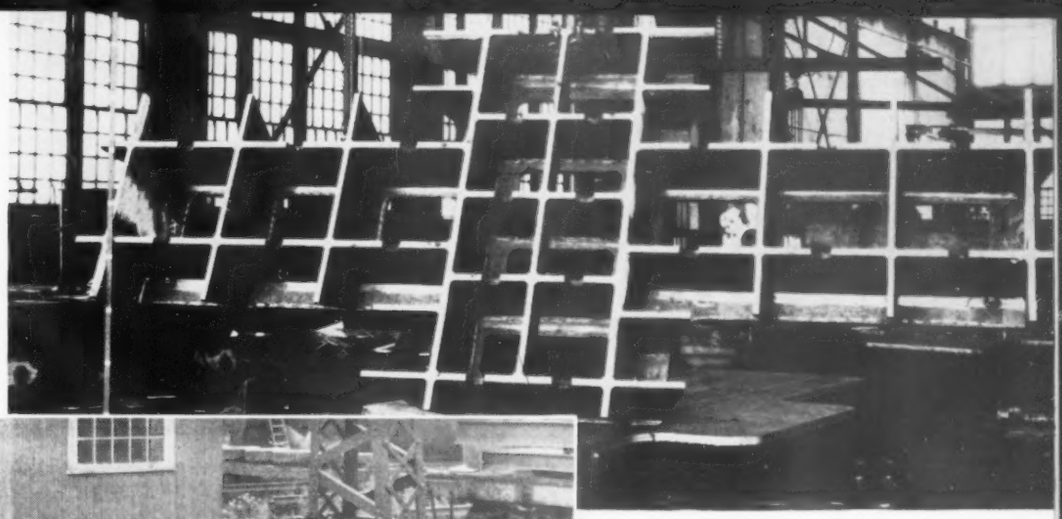


FIG. 1 (right)—Bridge pier member or shoe fabricated of steel plates. This shows the grid section with the cover plate partially welded to it, and resting on the bottom cover plate

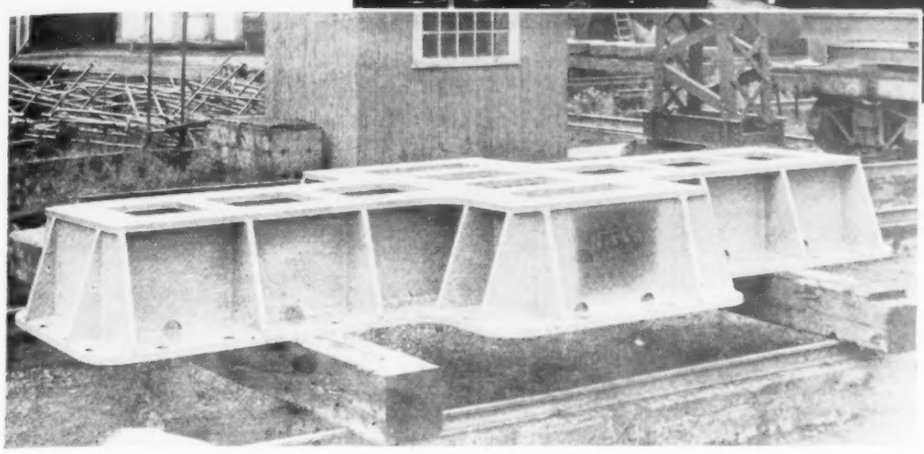


FIG. 2 (left)—The completed member ready for shipment. Two of these units were required, each 18 feet 4 inches long, 8 feet 6 inches wide, 2 feet deep and weighing about 10 tons

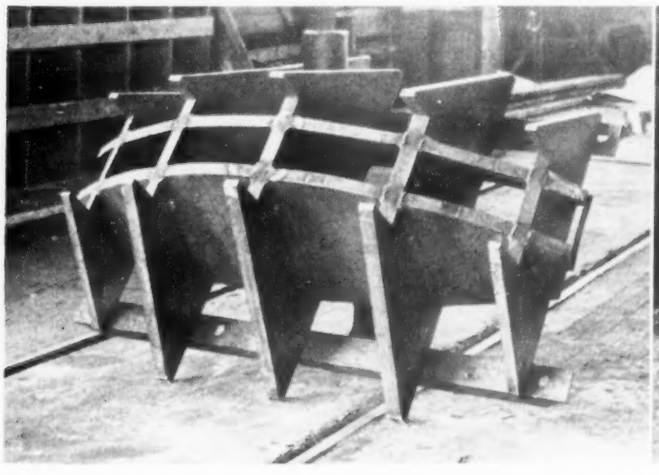
Shoes and Saddles for St. Lawrence River Bridge Gas Cut and Welded

BY DAVID BOYD, Assistant Works Manager,
Dominion Bridge Co. Ltd., Montreal, Canada

AN INTERESTING oxyacetylene cutting and welding job recently was completed by the Dominion Bridge Co. Ltd., Montreal, Canada. This involved the fabrication of two pier members or shoes to be placed under the main towers of the Isle d'Orleans bridge, under construction across the St. Lawrence river at Quebec. Each was 18 feet 4 inches long, 8 feet 6 inches wide, 2 feet deep and each weighs approximately 10 tons. Steel plates were used throughout.

After cutting the plates to size with a radiagraph machine supplied by Air Reduction Sales Co., New York, through Railway & Engineering Specialties Ltd., Montreal, the first operation was the assembling and tacking of the upright grid sections, as shown in Fig. 1. The grid for each pair was oxyacetylene welded in three sections, the center or transverse grid, and the two side grids; this was done by mounting the plate sections on universal fixtures and welding them, using ¼-inch covered electrodes and applying all welds in two passes. The right, left and center grids then were assembled, welded together and stress relieved.

After planing the top and bottom of the grid, the top cover plate was assembled and welded. This operation consisted of welding the top cover to the center or transverse grid only. Next, the bottom cover plate was assembled and welded in place throughout, starting at the center. Finally, the top cover was welded to the side grids. This unusual proced-



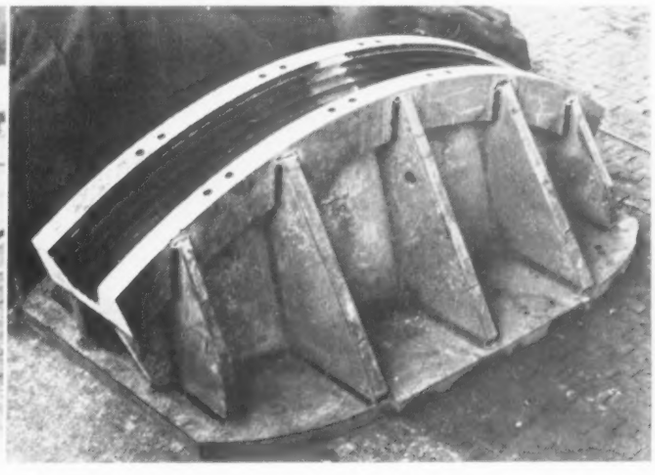
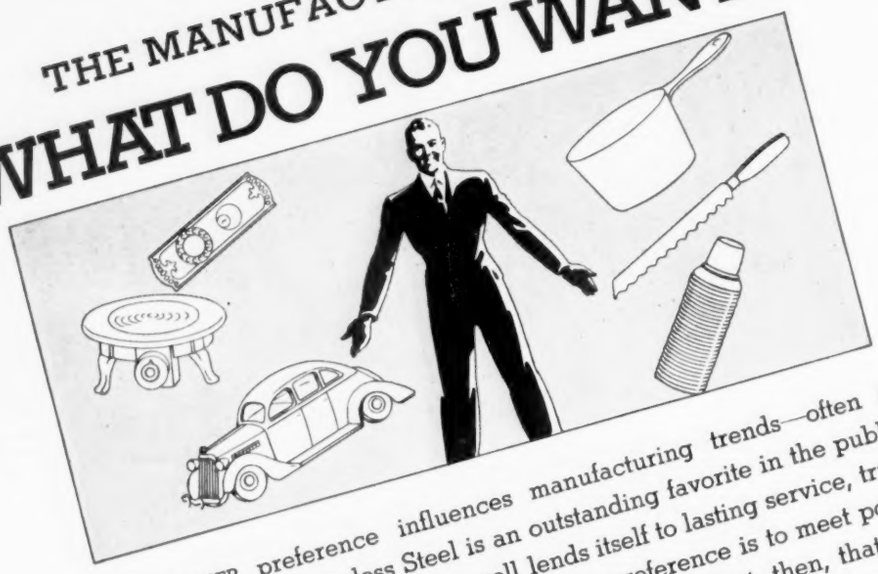


Fig. 3 (left)—Partially completed saddle for supporting the main cables at the tops of the bridge towers, also a gas-cut and welded steel plate assembly. Fig. 4 (right)—Completed saddle, weighing 4 tons

THE MANUFACTURER SAYS

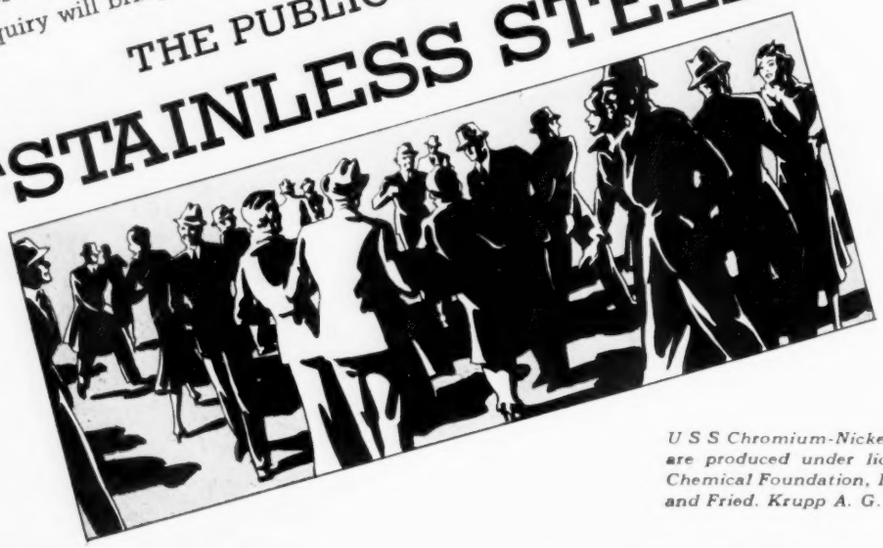
"WHAT DO YOU WANT?"



CONSUMER preference influences manufacturing trends—often dictates style, design and materials. Today—Stainless Steel is an outstanding favorite in the public mind. Rightfully so, of course, because no other metal so well lends itself to lasting service, true economy and beauty in line with modern ideals. To capitalize on this preference is to meet popular demand—to take the shortest path to maximum sales volume. May we suggest, then, that you fully investigate the possibilities of U S S Stainless and Heat Resisting Cold Rolled Strip Steel, Wire and Wire Products. Your inquiry will bring detailed and informative facts.

THE PUBLIC REPLIES

"STAINLESS STEEL"



U S S Chromium-Nickel Alloy Steels are produced under licenses of the Chemical Foundation, Inc., of N. Y.; and Fried. Krupp A. G. of Germany.

Correspondence is invited by the Companies named below—each with respect to the forms of steel that it produces:

AMERICAN SHEET AND TIN PLATE COMPANY, *Pittsburgh* - - - - - - - - - SHEETS AND LIGHT PLATES
AMERICAN STEEL & WIRE COMPANY, *Chicago* - - COLD ROLLED STRIP STEEL, WIRE AND WIRE PRODUCTS
ILLINOIS STEEL COMPANY, *Chicago* - - - BARS, PLATES, SHAPES, SPECIAL AND SEMI-FINISHED PRODUCTS
CARNEGIE STEEL COMPANY, *Pittsburgh* - - - - - SHAPES, PLATES, BARS AND SEMI-FINISHED PRODUCTS
NATIONAL TUBE COMPANY, *Pittsburgh* - - - - - - - - - - - - - PIPE AND TUBULAR PRODUCTS

Pacific Coast Distributors—COLUMBIA STEEL COMPANY, San Francisco, Calif. — *Export Distributors*—UNITED STATES STEEL PRODUCTS CO., New York, N. Y.

United States Steel USS *Corporation Subsidiaries*

USS STAINLESS
AND HEAT RESISTING STEELS

ure was observed to control distortion. The welds applied at the center to the top cover caused the appearance of a bow which would have been aggravated and permanent had it not been checked by welding on the bottom cover.

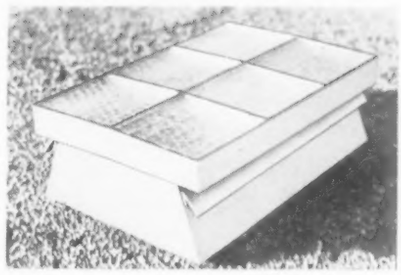
This procedure and welding sequence worked out admirably, producing a member that was accurate within 1/32-inch on all dimensions and with less than 3/32-inch bow or warp in the length of 18 feet. The machining allowance was ¼-inch on both top and bottom. As finished, the top cover was 1¼ inches thick, the bottom 1½ inches thick and the main webs 1½ inches thick. The finished pier member is shown in Fig. 2 on the preceding page.

Saddles for supporting the main cables at the tops of each tower were made in the same way. Figs. 3 and 4, showing a saddle under construction and completed, illustrate details of design. The base plate was 6 feet 4½ inches long, 4 feet 4¼ inches wide and 1½ inches thick after machining. The transverse webs were of 2-inch steel plate and the longitudinal webs of 1½ inch plate. The rope seat was fabricated from a 6½ x 16-inch slab. Finished weight of each cable saddle was 4 tons.

Asphalt Heater Requires Steel and Other Materials

Considerable steel, as well as other materials, is required in the manufacture of a new smokeless type asphalt heater developed by the Aeroil Burner Co., West New York, N. J. It is constructed of an outer shell and inner shell or melting kettle. Both shells, as well as the cover lid, are made of No. 14 gage blue annealed sheet steel, with welded joints. A special patented feature is a dividing screen which separates the melting kettle into two compartments and facilitates the flow of hot asphalt, by preventing clogging of the draw-off cock. This cock is of malleable iron. The double kettle is reinforced by steel angles, assembled by riveting, which also constitute the legs of the unit. At the bottom of the legs are pipe caps to present a smooth surface which will facilitate sliding the heater on and off trucks. For lifting the heater there are steel bar handles attached to the legs. There also is a windshield, made out of sheet steel, for providing protection to the burner flame.

This entire steel assembly weighs 265 pounds and is 40 inches long, 18 inches deep and 23 inches wide. Surfaces are protected with a coating of asphalt paint. The fuel, kerosene, is supplied from a 10-gallon portable tank which is made of copper bearing, galvanized, lead-coated steel sheet. The tank is provided with a coil of seamless steel tubing, a 2-inch diameter air pump, 7 feet of oil resisting rubber hose with brass hose nipples and a bronze regulating valve. Average oil consumption is 1½ gallons per hour.



Steel bars and tees are consumed in construction of this newly designed, ventilating skylight

New Ventilating Skylight Made of Fabricated Steel

A type of skylight construction, in whose design fabricated steel is used extensively, has been developed by the American Bar Lock Co. Inc., Long Island City, N. Y. Unlike the more conventional type, this construction calls for a welded and galvanized steel frame, made up principally of ¼ x 2½-inch bars and ¾-inch tees, rolled with special flanges to A. S. T. M. standards.

The bars, which are the supporting members, and the tees are assembled on 8⅝-inch centers, and form an integral protective shield around the glass, which comes in relatively small sections. Thick, wired glass, 9/16 x 8¼ x 8¼ inches, is used. The design provides for a minimum glass area of 90 per cent, with the space between the glass and the shield filled with special glazing compound to form an elastic, water-tight and weather proof expansion cushion.

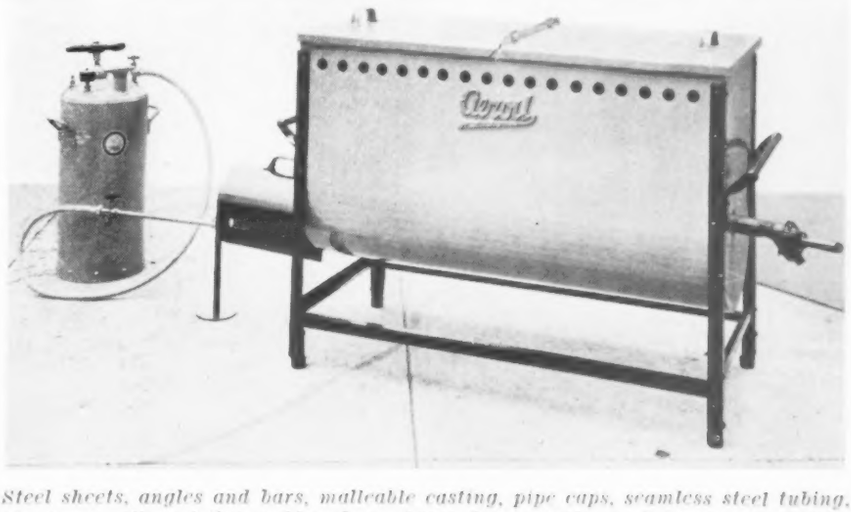
This type of construction precludes the use of moisture absorbing materials and of large sheets of thin glass; as a result, heavy breakage of glass is said to be prevented.

The skylight is laid in panels, each weighing about 12 pounds per square foot and designed to carry a live load of 125 pounds per square foot, permitting a person to walk on it with safety. The panels are constructed to span a clear opening of up to 10 feet. They usually are about 45 inches in width. This type of skylight may be set flush with the roof, if so desired, and may be installed on sawtooth and setback roofs.

Concealed automatic ventilation is provided, which eliminates condensation and is especially valuable in the event of fire as smoke can be carried off into the air. This ventilation feature has proved so satisfactory that the company has just placed on the market a special galvanized wrought steel ventilator, constructed principally of ⅛-inch material and incorporating the skylight feature. This unit is shown in the accompanying illustration.

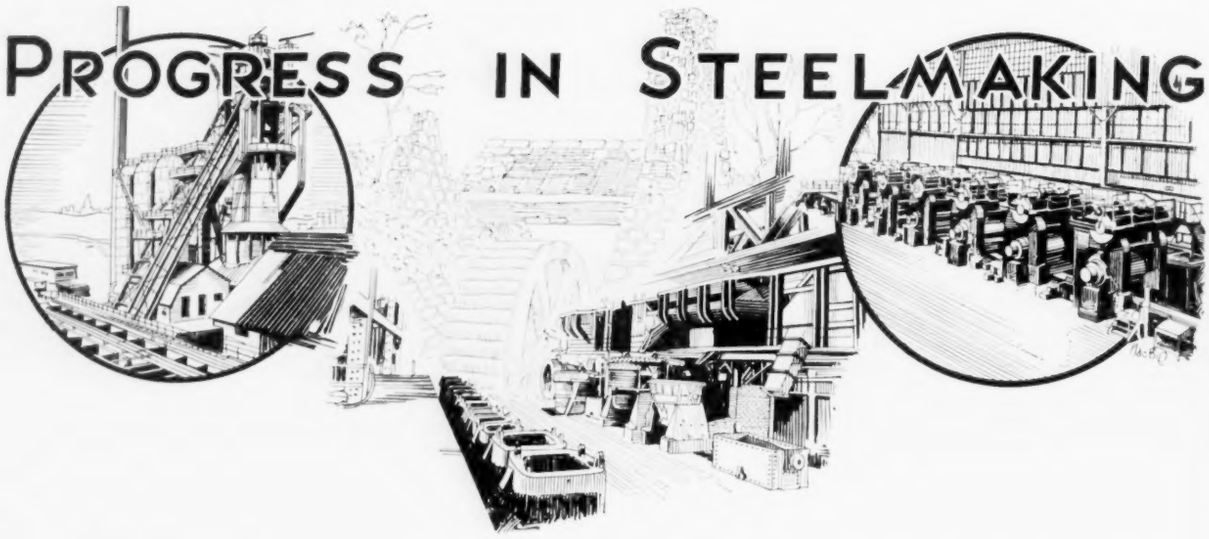
Method Produces Castings With Abrasive Surfaces

Metal castings with an integral face of abrasive material may be obtained by first spraying the mold face with graphite and molasses water or clay in water, according to a recent patent. Then the abrasive material is sprayed onto the coating so that its back surface remains exposed. The molten iron then is poured into the mold cavity, and it fills the minute interstices, holding the abrasive tightly in place. While not specified, presumably the inventor dries the mold before pouring.



Steel sheets, angles and bars, malleable casting, pipe caps, seamless steel tubing, air pump, oil resisting rubber hose, brass hose nipples and bronze regulating valve are required in constructing this welded and riveted, kerosene burning, asphalt heater

PROGRESS IN STEELMAKING



Solder Is Self-Fluxing

Strong, lasting joints are claimed for a new soldering flux recently developed for chrome copper, chrome steel, monel metal, nickel and other metals. The flux cleans as it solders.

• • •

Facing Prevents Dullness

Points of skulling hooks used at blast furnaces and steelworks for grabbing and pulling skulls out of ladles are dulled and worn away by severe abrasion. Preserving the shape of skulling hooks is accomplished at an Ohio mill by the application of hard-facing material.

• • •

Affords Longer Campaign

Abrasion resisting plates made of carbon-manganese-silicon steel give about three times the service normally obtained from $\frac{3}{8}$-inch tank plates, according to tests of a company which treats gravel. The steel in the as-rolled condition, has a tensile strength ranging from 115,000 to 130,000 pounds per square inch. Brinell hardness is about 235 minimum as compared with 126 maximum for steel of ordinary tank quality. A brinell hardness up to 300 can be obtained merely by varying the compositions to suit the application. The percentage of hardening elements in the steel is high but enough toughening constituents are present to offset the brittleness imparted by the high carbon.

• • •

Salvaged Brick Cuts Cost

Open-hearth doors lined with old chrome brick bats are giving good results at a Pennsylvania steelmaking shop.

• • •

Strip Is Annealed Faster

Electric annealing ovens are found to be 35 per cent faster than oil-fired equipment for annealing strip steel according to an eastern producer. Use of electric heat in his plant has effected a saving of $1.87 a ton in the annealing of high-carbon strip and $2.65 a ton in the annealing of low-carbon strip.

• • •

Unit Conserves Gas Supply

A photoelectric tube is employed at a buttweld pipe mill to control the valves in the air and oxygen lines which feed the jets which serve to heat the edges of the skelp just in advance of the weld. To prevent the waste of air and oxygen, the equipment is arranged so that the phototube causes the valves to open only when pipe is in position to be joined.

• • •

Alloy Die Steel Improved

A special die steel slightly increasing the molybdenum and nickel contents is proving somewhat superior to the regular chrome-molybdenum-nickel die steel, according to a forging producer.

Employs Alloy Steel for Gear Drives

BLOOMS ARE FORGED TO SHAPE—One of the largest boring mills ever built in this country utilizes alloy steel gears for driving the table. The smooth forged bevel gear with punched hole shown in the right background and weighing 4000 pounds is one of the driving members. Rough machined driving rings shown in the background and the pinion forgings in the foreground also are an integral part of boring table drive. The gears were forged from 20-inch alloy steel blooms by the Commercial Forgings Co., Cleveland

BUILT BY MORGAN *Engineering* » »

Pioneer builder of heavy duty steel mill cranes, Morgan Engineering inevitably builds into any crane for any purpose all the advantages of the most advanced engineering principles along with traditional Morgan soundness. This 10-ton, double hook, Morgan mill type crane for handling pipe in a mill warehouse is as well built and carefully engineered as a hot metal crane. Of all elements entering into construction of anything Morgan builds, Morgan integrity is the most valuable ingredient of all.

THE MORGAN ENGINEERING CO.
ALLIANCE, OHIO

Pittsburgh, 1420 Oliver Bldg.
New York, 11 W. 42nd St.

MORGAN PRODUCTS » »

ELECTRIC TRAVELING CRANES
PLATE MILLS • BLOOMING MILLS
INGOT STRIPPING MACHINES
CONTINUOUS MILLS • STRUCTURAL MILLS
CHARGING MACHINES • LADLE CRANES
STEAM HYDRAULIC FORGING PRESSES
SOAKING PIT CRANES • STEAM HAMMERS
SPECIAL MACHINERY FOR STEEL MILLS

DESIGNERS
MANUFACTURERS
CONTRACTORS

Observations on Slack Wind Blast Furnace Operation

BY FRANCIS M. RICH, Superintendent Blast Furnaces
Republic Steel Corp. Youngstown, O.

Part II

ON ONE occasion the top gas was found to be low in CO_2. The furnace had not been carrying the usual amount of burden, so immediately some tests were run on samples taken at 9 inches from the inwall. These showed the gas to be channeling through the center, so a heavier ore layer was charged with gratifying results.

Another time it was found that the gas was traveling up the walls. A lighter ore layer was put on by a change in filling, after which the furnace straightened out.

Uniformity of the blast temperature distribution at the tuyeres is best checked by installing thermocouples in the tuyere stocks. Any discrepancy in these temperatures is due either to the incorrect location of the cold air mixer line connection with the hot blast main or poor design or location of the hot blast main itself. We ran tests of this nature on three furnaces operating in the same plant with hot blast mains of the same size and design, but with different mixer connections. The mixer connections were located (1) at the extreme end of the hot blast main away from the furnace, (2) at the hot blast valve well on each stove, and (3) between the stove nearest the furnace and the bustle pipe connection. The first two named showed practically the same temperatures on opposite sides of the hot blast main connection, but the last showed a variation of at least 100 degrees Fahr. at all times.

Tuyere Area Varies

The correct tuyere area for each different volume of blast blown has been a point on which many furnacemen disagree. One furnaceman states that a figure of 6.75 square inches of area per 1000 cubic feet of blast per minute was correct. Another man informed us that a constant of 6.25 square inches was better for his practice. These figures indicate that some furnacemen are of the opinion that the velocity of the blast at the nose of the tuyere must be held constant. We can best give our own views by a review of an experience. The blast volume had been decreased from 38,000 to 28,000 cubic feet per minute. This was the lowest point at which the wind had been held on the furnace at that time. The furnace had done excellent work on 38,000 cubic feet per minute with twelve 5 x 12-inch tuyeres, so when the wind was lowered the new area was proportioned according to the constant velocity theory in this manner:

$$\text{Tuyere area for } 38{,}000 \text{ c.f.m.} = 12 \times 0.786 \times 5^2 = 236 \text{ sq. in.}$$

$$\text{Tuyere area for } 28{,}000 \text{ c.f.m.} = \frac{236 \times 28{,}000}{38{,}000} = 174 \text{ sq. in.}$$

Accordingly, nine 4 x 12-inch tuyeres were installed, making the area 172.2 square inches. The furnace did not work smoothly and it required constant checking to keep it moving. The iron looked cold in the runner in spite of the fact that the analysis was within specifications. Some temperatures as low as 2500 degrees Fahr. were read on an optical pyrometer, whereas the iron normally ran around 2700 degrees Fahr. It was noticed that the 4-inch tuyeres were "dead" with little action, while the 5-inch tuyeres showed normal movement of the coke. It then was recalled that the weight of the blast entering each tuyere was a factor as well as the velocity in producing normal tuyere action.

The three 5 x 12-inch tuyeres were replaced by 4 x 12-inch tuyeres, making the total area 151 square inches.

The tuyeres were normal at once, and in a few days the furnace was working smoothly and the iron was hot enough.

The question may arise as to how fast the wind can be increased or decreased on a furnace without seriously affecting the operation of the furnace and the quality of the product. Our experience is that the wind can be increased at the rate of 2000 to 2500 cubic feet per minute per 24 hours and decreased at twice this rate, provided that the walls are fairly clean and that the correct tuyere size is used. It has been found that, where the wind was increased substantially, the practice for the first month of operation on the higher blast volume was unsatisfactory. At the end of this first month the furnace was generally operating normally.

The question of just how low it is possible to go with the wind on a given furnace is often asked. It is our opinion that the minimum size of tuyeres is the limiting factor. It probably is possible to operate on 2-inch tuyeres, if the size is any smaller great difficulty will be experienced. Another consideration is that the bottom and walls of the hearth tend to build up on low wind. It is possible that the bottom might build up to the point where the product could not be extracted from the tapping hole. The rate of decrease of coke consumption is lower with each corresponding decrease of wind which implies that the coke rate will reach a minimum at some low volume and then increase as the wind volume is lowered still more. This point is where the fuel economies affected by the low wind and resulting efficient gas-solid contact exactly balance the ever-increasing radiation and cooling water loss.

Specific Blast Volume Exists

There is one particular volume of blast for each furnace that will produce a certain tonnage of iron at a cost lower than the cost will be at any other blast volume, with the same raw materials, prices, labor costs, and equipment. It is the duty of each operator to determine this point on each furnace under his supervision, and thus arrive at the most economical rating for each size furnace operating under the given set of conditions.

The decreased coke rates and flue dust productions on slow wind are due partly to the decreased volume of blast and partly to the slowing up of the descent of the column of stock. It is impossible to determine, at the present time the relative effect each of these conditions have on the increased economical working of the furnace, but it is our opinion that the lower blast volume has the greater effect.

It is possible to use heavy batters on the furnace inwall with low volumes of wind, but when high volumes are blown this reacts unfavorably on the furnace practice. Too small a batter retards the descent of the stock, and this often results in the "hanging" or uneven movement of the charge. Inwall batters may be classified roughly as follows:

Light batter—Under 0.8-inch per foot.
Medium batter—From 0.8 to 1.0 inch per foot.
Heavy batter—Over 1.0 inch per foot.

ABSTRACT of Mr. Rich's paper presented Feb. 18 before the American Institute of Mining and Metallurgical Engineers in New York. The first installment appeared in last week's issue of STEEL.

Castings for Oil Refineries Create Production Problems

ALLOY steel castings for refinery equipment present more intricate and special problems than do alloy steels which are to be rolled, forged or drawn. Steels for rolling, for example, are restricted to types which permit the production of fairly large tonnages, whereas castings are made in limited tonnages. The newer demands for castings are met by steels alloyed particularly with chromium and nickel, and with some other elements. These facts were brought out in the symposium which the American Institute of Mining and Metallurgical Engineers conducted recently on the use of metals in the petroleum industry.

Because of the specific demands placed upon castings for refinery equipment, restrictions entering into materials bear heavily upon steel foundries, according to W. F. Furman, Duralloy Co., Pittsburgh. A slight change in analysis may result in quality improvement of castings, a case in point being the 18-8 chrome-nickel steel, not an especially desirable combination from the foundrymen's standpoint. Better results have been attained by increasing the percentage of both in the casting, especially chromium, according to Mr. Furman. Corrosion resistance is somewhat increased and higher chromium content makes for a possible higher content of carbon and as a rule sounder castings. Foundries are sometimes restricted to the lower analysis range, however, because they are more or less standard to rolled products. Test bar figures for refinery materials have only a theoretical bearing on commercial steel castings of the same heat, Mr. Furman holds.

Castings Carry Heavy Loads

Castings for high temperatures are mostly for tube supports, beams, hangers, etc., in oil-cracking stills and must maintain considerable loads for indefinite periods; resisting oxidation at high temperatures. Such material must also be fairly immune to corroding action of sulphur gases. Safe load figures by several producers of castings, reasonably close to analysis, favor an alloy of 24-26 per cent chromium and 10-12 per cent nickel at several working temperatures with a minimum of 24 per cent chromium to insure satisfactory oxidation resistance.

Products in combustion in oil-cracking practice run fairly high in sulphur. Nickel being susceptible to sulphur attack, alloys in such installations should not contain nickel of over 12 to 13 per cent and some increase in chromium is also helpful. A steel of about 28 per cent chromium with 10-12 per cent nickel usually is satisfactory. For tube supports at temperatures from 1600 to 1800 degrees Fahr. and low sulphur conditions, a 23-26 per cent chromium steel with enough nickel to give strength and hardness is favored.

Find Loss of Tungsten

Tungsten in small amounts, 2 to 4 per cent, added to 24 per cent chromium and 12 per cent nickel steel for tube support adds to initial high temperature strength of the alloy, but its effect over long periods of exposure is less certain. Such equipment may show effects of tungsten loss after several hundred hours, especially if temperatures above 1600 degrees Fahr. are encountered. The same may be applied as to experience with molybdenum and other ferroalloys. Molybdenum, however, has a decided value when added to chromium-nickel alloys, particularly in the 18-8 chrome-nickel range, when resistance to corrosion is important. Its value for high temperatures is uncertain. Titanium in small quantities is beneficial in resistance to embrittlement.

Some foundries are casting tubular forms by the centrifugal process. A denser casting is attained, a finer grain secured with walls uniform and strength increased. Another advantage is an inside diameter concentric with the outside. Gas pockets, interior shrinks and other defects are eliminated. In at least one cracking process the centrifugal casting has been successfully applied.

Modifications and refinements in the 4-6 per cent chromium alloy steels, being used more and more extensively, together with increasing rigidity of specifications and inspection, will probably mean that eventually this alloy group will be made to better advantage in a specialty alloy foundry than in the ordinary steel foundry, according to Mr. Furman, who says also:

"The potential field for alloy castings in the oil industry is still large, notably castings to resist various forms of corrosion; also high temperature applications where alloy castings could be substituted with economical gain for ordinary metals now used."

Metals for Heat Exchangers

Improvement in design of heat exchanger equipment and condensers has had a profound result in the development of metals to meet the severe requirements of the refinery, according to H. L. Bedell, White Eagle Refining Co., Augusta, Kan. Early observation was that equipment employed in the steamship engine room for condensing exhaust steam was applicable to refinery practice in exchange of heat in the process of distillation, but progress and experience has further expanded the basic principle. Materials used in heat exchangers are subject to sharp temperature differences but failures due to physical causes are few. Acceptance by trial, rather than by laboratory tests is more practical, however, due to many varied conditions confronting refineries, in Mr. Bedell's opinion.

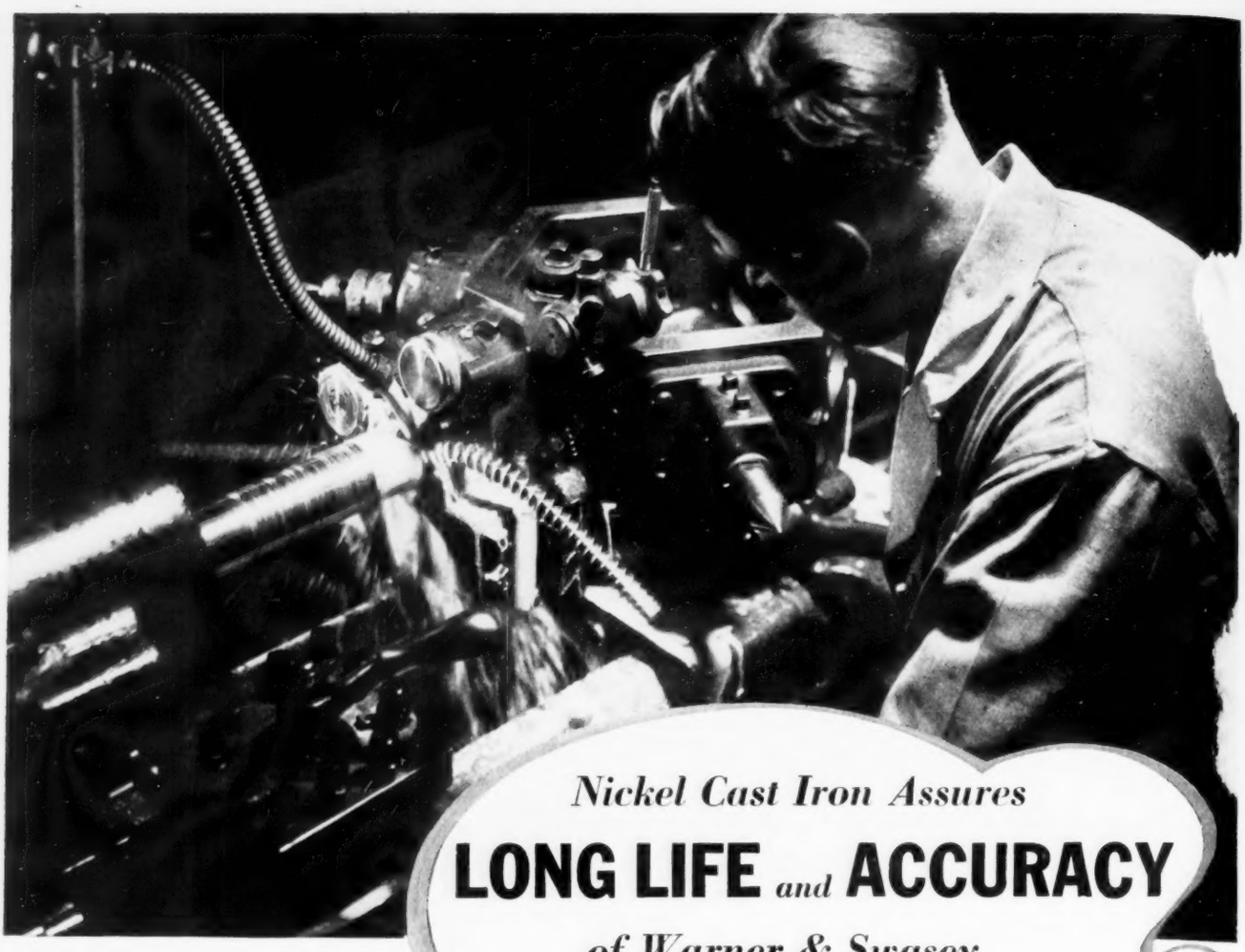
Failures in condenser tubes from the water side usually are caused by galvanic action which is set up by the dissimilarity of metals in the equipment. In the use of alloys, the slightest deviation from complete homogeneity of metals is almost certain to develop galvanic action with loss of metal and tube holes resulting. Alloys with relatively high content of zinc fail through loss of zinc, due either to galvanic action or high alkalinity of water. Condenser systems in most refineries have cooling equipment in which water is sprayed into the air, absorbing large amounts of oxygen. The number of ferrous and nonferrous alloys advocated in heat

---

THAT the specialty alloy foundry eventually may be at a better advantage in producing steel castings in the 4 to 6 per cent chromium alloy group than the ordinary steel foundry was a prediction of one metallurgist at the two-session symposium on the use of metals in the petroleum industry held in New York on Feb. 21 in connection with the annual meeting of the American Institute of Mining and Metallurgical Engineers. This group of alloys is being used more and more extensively in oil refining plants.

Use of the centrifugal casting process for producing tubular forms has demonstrated improved results in at least one oil cracking process. Substitution of alloy steel castings for corrosion resistance and high temperatures and pressures in place of ordinary metals now used is another forecast.

On the accompanying page STEEL *presents the concluding portion of its report on this important symposium; the first part appeared on pages 63 and 64 of the March 4 issue.*



Nickel Cast Iron Assures

LONG LIFE *and* ACCURACY

of Warner & Swasey Turret Lathes!

MODERN MACHINE TOOLS owe much of their superior power, speed and accuracy to the marked improvement in modern engineering materials . . . especially the alloys containing Nickel.

Warner & Swasey are liberal users of these Nickel Alloys and the following tribute to Nickel Cast Iron is quoted from a recent statement of President P. E. Bliss:

"The reputation that Warner & Swasey turret lathes have won over the past fifty years, can be attributed to the painstaking accuracy of our engineers and the high quality of workmanship and materials that go into these machines.

"Take the bed or base of these turret lathes for example. They must withstand all the stresses and strains imposed on the machine and maintain their original accuracy.

"In making our castings The Sterling Foundry Company, Wellington, Ohio, uses 1½% nickel to obtain a nickel high test iron made with an 80% steel mixture, attaining a very low carbon content and unusually fine distribution of graphite. And although these castings in certain instances have a hardness of 260 Brinell and a tensile strength as high as 50,000 pounds per square inch, they are readily machinable.

"These castings are exceptionally uniform in density or grain in all the variable thin and thick sections and are built to the maximum machinable hardness, producing a very fine finish. Without the use of your nickel we would be unable to obtain the same machinability, using the same base analysis. In consequence we claim definite high quality for our product through the use of your nickel."

• • •

In addition to machine tool equipment Nickel Cast Irons are being used today with success and economy for a wide variety of castings . . . for internal combustion cylinder blocks, heads, liners and pistons; locomotive cylinders and parts; gears; cams; pump bodies, valves and parts; compressor parts; steel mill rolls; grinding, crushing and sizing equipment; plow points, mold boards, etc.

Our casting specialists will gladly cooperate in selecting compositions best suited to your requirements.

NICKEL CAST IRONS

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York, N.Y.
Miners, refiners and rollers of Nickel
Sole producers of Monel Metal

exchangers and condensers are numerous. In heat exchangers, admiralty metal has given excellent service, being one of the first used. Alloys of copper, zinc, tin or iron also are recommended and used. Copper-nickel tubes and tubes of copper, nickel and aluminum are of more recent development. Admiralty metal tubes show service improvement when the zinc content is low, reducing the possibility of dezincification. Copper tubes and copper tubes containing small amounts of arsenic or silicon also are coming into more favor, the latter being best at relatively low temperatures, below 300 degrees Fahr.

In the ferrous group, 4-6 per cent chromium steel alloy, 18-8 chromium-nickel and plain carbon steel are used. Based on one set of general conditions, but not suggested to hold for all, materials for both heat exchanger and condenser type tubes rank in order of service alone as follows: No. 1—copper-nickel and copper-nickel-aluminum; No. 2—copper and copper-arsenic or silicon; No. 3—copper-zinc-tin; No. 4—4-6 per cent chromium steel; and No. 5—plain carbon steel.

"Choice of material should be determined by service attained and initial cost", said Mr. Bedell. "A tube costing double, installed, must give a little more than double length of service to warrant the investment."

More Dependence on Welding

While fusion welding has been done about refineries for a long period, only in the last 5 or 6 years has this type of fabrication been employed in the construction of the more important vessels, according to R. K. Hopkins, director of metallurgical research, M. W. Kellogg Co., New York. Fabricators of such vessels are required to furnish units suitable for operations over wide ranges of conditions. Temperatures range from 950-1000 degrees Fahr. to sub-zero lows of —75 degrees. Pressures may range from 1000 pounds per square inch to as low as 29 vacuum. Steelmakers and metallurgists have co-operated closely, and, with general success to provide base metals to meet such ranges while the fabricator's problem has been that of securing a welding rod and welding technique; also heat treatment to produce weld characteristics comparable with base metals. At low pressures and temperatures carbon steel may be satisfactory but for the higher ranges alloys are used.

Meeting Low Temperature Service

For sub-zero temperatures, ordinary carbon steel is not suitable especially when impact resistance is a factor, alloy steels being required for such service. Because of better fabrication characteristics, 2¼ per cent nickel alloy, high in impact value at low temperatures, is adopted by some refineries. Proper heat treatment also aids in low-temperature corrosion resistance and a normalizing treatment should be specified for heads. Large nickel steel vessels are used in dewaxing service as a result of tests and actual experience.

Although fabrication and heat treatment of high alloy steels for corrosion resistance and extremely high temperatures is more difficult than carbon steel construction, the first-class fabricator is in a position to furnish fusion-welded vessels for every type of refinery service, according to Mr. Hopkins.

A.I.M.E. Studies Steelmaking Practice And Characteristics of Alloy Steels

ALL the ills of steelmaking cannot be traced to ladle and teeming practice, according to G. D. Tranter, general superintendent, American Rolling Mill Co., Middletown, O., who addressed the iron and steel division of the American Institute of Mining and Metallurgical Engineers during the organization's annual meeting in New York, Feb. 18-21. Other factors include soaking pit heating, subsequent rolling, and proper co-operation between open hearth and blooming mill departments, if certain defects originating in the ingot are to be minimized. Bad steel, Mr. Tranter declared, can not be perfected by manipulation during teeming, but through judicious handling of "off heats," serious losses which may arise in many cases can be minimized. Good steel can be ruined in the soaking pit, he said.

Tracing Origin of Defects

Mr. Tranter's paper dealt primarily with ingots for sheet mill rolling, therefore, with rimming steel. In general, factors affecting the origin of defects in ladle and teeming practice are:

1—Running stopper resulting from mechanical failure of the stopper rod, stopper head, nozzle or manipulating mechanism.

2—Failure to properly clean ladle molds between pourings, poor lining practice, failure of refractories and too rapid pouring speeds.

3—Improper technique and manipulation in teeming metal from the ladle into molds.

4—Mold design, temperature of molds at time of teeming, cleaning and conditioning of molds, type and methods for applying mold coatings.

5—Capping ingots, elapsed time for pulling, stripping and charging ingots into soaking pits.

Welded ladles have made it possible to increase size of heats when building columns, crane runway and ladle cranes are of sufficient capacity to carry larger heats. The welded ladle often is 25 per cent lighter and the difference in weight may be utilized for added ingot weight, or about 7 to 8 tons on a 125-ton ladle. Insulation of ladles also has been developed satisfactorily with the use of insulating cement, Mr. Tranter stated.

General instrument control of open-hearth furnaces has proceeded with too much speed with insufficient soundness, said W. C. Buell Jr., engineer, Cleveland. "The reason for this condition," he said, "lies not with the manufacturer of the apparatus, but with the open-hearth executive, who, in his quest for the economy his superiors are demanding, has attempted to reach his goal by short-cuts." Fundamental design of the furnace and its operation must be developed to the extent that further basic improvements can not be made, and, with this achieved, improvement in operation will follow rapidly, in Mr. Buell's opinion.

Wider Use for Bessemer

Although the bessemer process ranks second in total steel ingot production, being four times greater than acid, crucible and electric combined, the general importance of this steel has been neglected from an economic view-point, according to C. E. Henning, assistant general metallurgist, Jones & Laughlin Steel Corp., Pittsburgh. Latest available figures indicate production of bessemer is close to a million tons more annually than alloy steel ingots.

Free-cutting, weldability, stiffness, sensitivity, machinability and high tensile strength, are properties allowing for specifications covering a wider range of products and uses, Mr. Henning declared. In screw steels, free cutting and machinability has been readily appreciated. Highly rated as to weldability, advantages of bessemer are recognized in the manufacture of pipe and tubes. A higher yield point and greater tensile strength as compared with open-hearth steel of approximately the same carbon content is indicated on stock for both hot and cold operations. Failures in copper-bearing bessemer steel sheets exposed to normal atmospheric conditions, are fewer than those in copper-bearing open-hearth steel, indicating superior corrosion resistance.

For tubes to be welded, notably

for motorcycle frames, bessemer is the better steel, according to Mr. Henning. Its use in tin plate has been due largely to its stiffness and ability to form more truly and retain its shape better than other steels. Coiling tests also have revealed superior qualities of bessemer for such work. Despite its admitted superiority for many uses, the best known being screw stock, skelp, bars, tin plate, bars and special structural material, Mr. Henning took the view that a much wider field for industrial use is possible. In the production of bessemer ingot the average loss he estimated at 8.45 per cent with carbon burned 4.30 per cent, silicon, 1.25 per cent; manganese, 0.40 per cent, slag and pellets 1.50 per cent and ejected and volatized 1.00 per cent.

The future of wrought iron has been made easier as a result of passing the difficult hurdle of manufacture, according to James Aston, A. M. Byers Co., Pittsburgh. Its use will be linked with a greater diversification of products and specialization to fit specific needs. Misconceptions regarding wrought iron on the part of many of its users is rather amazing and the haze should be lifted with less confusion of the issue, according to Mr. Aston. Major producers, he said, have adhered to quality standards and have directed attention to the subterfuge in some fields of supplying a request for quality wrought iron with a product made by bushelling common scrap. Such methods have had a harmful effect on the industry.

Transformations Are Studied

Transformation temperatures in tests on five iron-chromium alloys of low carbon content, 9.03 per cent and less, and containing 3 to 11 per cent chromium on cooling, are much lower than those noted on heating and the action is related to the rate of transformation of austenite to ferrite. This lag can be estimated to give this rate of transformation as a function of temperature. Results were attained by J. B. Austin and R. H. H. Pierce Jr. research laboratory, United States Steel Corp., Kearny, N. J., in a study of linear thermal expansion and transformation phenomena of low-carbon iron-chromium alloys. Dilatometer readings also show the rate of transformation of the alloys on cooling is of the same type as the rate for nickel and manganese steels.

Results of further investigation of reactions of alloy steels in the solid state, notably the initial course of subcritical isothermal diffusion reactions in austenite in alloy steel were outlined by H. A. Smith, metals research laboratory, Carnegie Institute of Technology, Pittsburgh. Alloy specimens for the work included hypereutectoid manganese steel of 6.48 per cent manganese, 0.92 per cent carbon, 0.013 per cent sulphur, 0.19 per cent silicon and 0.037 per cent phosphorus, the remainder being iron. As in other investigations, it was found that the initial stages of decomposition of austenite in the alloy steel at a temperature of 450 degrees Cent. is a slowly reacting action, allowing detailed observation. Microscopic observations are considered most reliable for determining the volume percentage of the various phases present. An initial decrease in the conductivity of the interstitial solid solution of carbon in gamma iron was observed, placing such an alloy as regards this behavior in the same class with numerous other solid solutions.

Determines Copper Solubility

Using X-ray methods in his research to determine the solubility of copper in iron, Prof. J. T. Norton, Massachusetts Institute of Technology, Cambridge, Mass., places the maximum solid solubility at 1.4 per cent of copper by weight. With decreasing temperature, solubility also decreases and is constant below 1200 degrees Fahr. at a value of 0.35 per cent. Lattice changes, correlated with hardness values, indicate the principal increase in hardness which takes place prior to the precipitation of the copper-rich phase in the experiment. Maximum hardness occurs, at all temperatures, at which age-hardening can be observed, when about 20 per cent of the available copper has been precipitated. At all such temperatures complete precipitation finally occurs accompanied with a decrease in hardness.

Prof. Norton concludes that age-hardening is due to the pre-precipitation rearrangement of the solid solution, the most evident reason, and actual precipitation, a secondary cause; also that the relative magnitude of these two factors is not dependent on the aging temperature. Alloys used by Prof. Norton were produced by melting iron and copper of high purity in a vacuum in a high frequency furnace. Ingots were remelted to insure homogeneous composition and annealed in dry hydrogen at 1650 degrees Fahr. for 100 hours.

Only at quenching temperature from 1100 degrees Cent. upward, do high-vanadium steels with a higher carbon content assume a marked hardness. At temperatures up to 400 degrees Cent. there is practically no difference in hardness between plain carbon and vanadium steels. The tempering phenomena also makes appearance only after quenching from the higher temperatures, 1100 degrees Cent. and upward. Stability of hardness upon tempering increases with the quenching temperature and the proportion of dissolved vanadium carbide. These conclusions are reached in a paper by E. Houdremont, assistant manager, Krupp Steel Works, Essen, Germany, H. Bennek and H. Schrader, which reviewed hardening and tempering of steels containing carbide of low solubility, especially vanadium steels. Effect of vanadium in stability hardness makes itself felt with very low vanadium content.

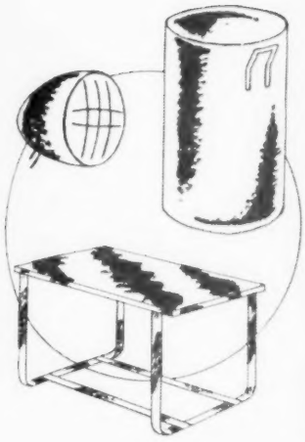
Behavior of Vanadium Steels

Chromium steels, also chromium-nickel steels, when quenched from normal temperatures reveal that the vanadium content exerts no effect on the mechanical properties; that on the contrary, some carbon combining with vanadium, there is a tendency for the vanadium-bearing steels to become softer. However, when the higher quenching temperatures are used, the vanadium-bearing steels show marked increase in tensile strength and yield point upon tempering. Yet at these same high quenching temperatures vanadium-free steels are not materially affected. The vanadium-bearing material at the higher quenching temperatures lose impact value, however, due to precipitation of vanadium carbides. Addition of vanadium, coupled with an increase in quenching temperatures, in chromium-molybdenum steels produces a similar improvement in mechanical properties. In the quenching of chromium-molybdenum steels at low temperatures, the influence of molybdenum makes itself

(Please turn to page 64)

Want To Build It?

SEEKS U. S. MANUFACTURER: Folding and closing of commercial letters is accomplished by a new machine, thus saving the expense of envelopes. Built of steel, suitably finished, one model operates electrically at high speed, while another, at slower speed, is operated manually. The accompanying illustration shows both models. The inventor, Maximilian Voglmayer, 20 Wipplingerstrasse, Vienna, Austria, is seeking to license their manufacture in the United States



ARMCO

CAN RENDER YOU A VALUABLE SERVICE

He's the Armco Stainless Steel Man, and he can help you select the grade and finish of stainless steel that will best fulfill your design.

You know design and what you want to achieve; he knows the qualities, characteristics and possibilities of stainless steel. The two of you can team up to mutual advantage and profit.

Behind this experienced, metal-minded man are the tremendous research facilities and production resources of Armco—one of the world's largest producers of special analysis iron and steel sheets.

You open the doors to all this when you call in the Armco Man for discussion of your metal problems.

Remember, too, that Armco Stainless Steels have all the good qualities you have visualized in the finished article. They are highly resistant to many forms of chemical corrosion; are attractively finished, sanitary in use, and may readily be fabricated to the most complex designs. In short, they enable you to design freely better-looking, longer-lasting, more *sales-appealing* products.

Shall we mail a copy of our useful handbook? Or, if you wish, we will gladly send an experienced Armco man to see you. This will commit you in no way, and may be the beginning of a really helpful relationship. Just say the word: what you want us to do.

THE AMERICAN ROLLING MILL COMPANY
Middletown, Ohio

ARMCO STAINLESS STEELS

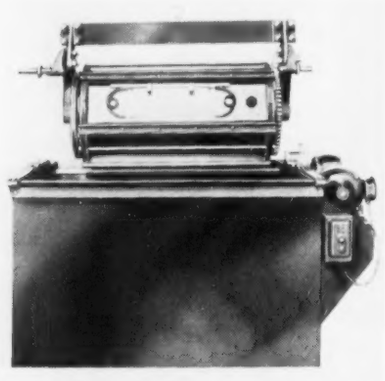
LIGHT • STRONG • FINELY FINISHED • DURABLE

NEW EQUIPMENT

Plating Barrel—

Udylite Co., 1651 East Grand boulevard, Detroit, has just developed a plating barrel for alkaline plating solutions. The unit, shown herewith, is constructed of steel and shock-resistant rubber. The cylinder consists of a framework of steel into which are fitted rubber rails and heads. Entire steel framework is anodically charged so that it does not plate.

Rubber was chosen as the insulating material for the panels, rails and



Udylite plating barrel constructed of steel and shock-resistant rubber

heads, because it does not disintegrate by absorbing plating solution and will resist wear better than any material available for plating barrel construction, according to the company. The material used is a special, shock-resistant rubber, formed, not molded. Combination of steel and special rubber results in plating cylinder having unusual strength.

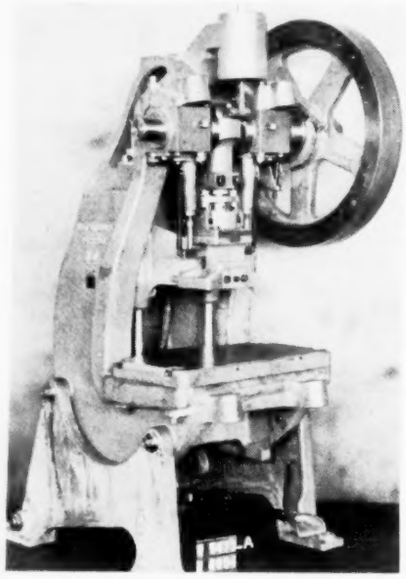
Durability and efficiency of plating barrels is dependent on the insulation, the manufacturer declares. Proper, efficient insulation eliminates treeing which is the principal cause of barrel destruction and loss of efficiency. In the new barrel, there is no treeing; all of the current goes directly to the work. Cathode lead is encased in continuous, unbroken insulation from contact pins to dangler arbor (no slip joints). Cast iron hanger from which cylinder is suspended is not integral with or a part of the cathode lead. Consequently, strains in the hanger have no effect on the lead and do not cause its covering to crack. Such cracks in the insulation would cause treeing.

Thermo-controlled push button switch, conveniently located, guards motor against overloading or single phasing. Welded steel tank is of ample size to hold heating and cooling coils. A speed latch insures positive contact. A flick of the finger operates it. The door lock operates as unit, snapping in and out of place with one movement.

◆ ◆ ◆

General Purpose Two-Post Presses—

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., recently developed a new line of presses that embody a new type of gate guiding for the open-back press field. The gate guide is obtained by clamping the gate to two chrome vanadium steel rods which slide in tapered bushings located above and



No. 44 Waterbury Farrel general purpose two-post open-back press

below the tools. This gives a extra long guide to the gate and insures that the gate will be under control during the complete cycle of the press. The effect that this type of guide has on the tools is to cut the spring of the press in half at the point where the normal punch would contact the die. The same length of guide is maintained during the complete stroke.

These presses are furnished with a dash pot which prevents the gate from dropping when it goes over centers. This also allows the press to be run with less friction on the shaft and consequently means less heat in the bearings and less wear. There is a new type ball and socket connection on these presses. The ball is seated in a cast iron seat, but the pressure of the return stroke is taken on a steel plate which is connected to the seat through two links. In the event of wear it may be taken up by simply grinding a little off two washers located under the return plate, then resetting the nuts.

An adjustable bar knock-out is located in the gate and may be removed if desired. The presses are furnished with a capped gate and have large tool space, thus permitting plenty of light on the tools. The machines are all inclinable to 35 degrees and may have tie rods. They can be furnished with back gearing from the No. 33 size up. The capacities range from 10 to 50 tons. A No. 44 size machine is shown in the accompanying illustration.

◆ ◆ ◆

Hand Lift Trucks and Skid Platforms —

Yale & Towne Mfg. Co., Philadelphia, recently introduced new hand lift trucks and skid platforms designed for speedy handling of loads up to 1000 pounds. The accompanying illustrations show the two units. Compactness of the equipment

Compact hand lift truck introduced by Yale & Towne Mfg. Co.

is exemplified by the fact that the truck will handle a 36 by 42-inch skid platform in a four-foot aisle. Steering through a caster wheel permits the use of this truck in a minimum amount of operating space.

To elevate the load, the operator grasps the handle, depresses the treadle and leans back. His weight by this leverage action lifts the load. The handle remains in position to pull the load away. In lowering the load the operator pulls down on the handle, depresses the treadle and allows the weight of his body to act as a counterweight.

The load may be pushed or pulled with the handle locked in vertical

Yale & Towne skid platform for use with hand lift truck

position. It also may be pulled with handle extended to normal pulling position. Lifting mechanism of the truck is of steel and malleable castings. Reinforced steel plate welded between side rails provides a deck which will permit the truck to handle loads with or without the skid platform. Engagement of the platform with the lifting mechanism is positive and foolproof. When locked in elevated position the platform cannot be released accidentally.

• • •

High Intensity Mercury Vapor Lamp—

General Electric Vapor Lamp Co., Hoboken, N. J., has perfected a high intensity mercury vapor lamp which is particularly suitable for high bay lighting. The lamp, shown herewith, is a new approach, according to claims, to an industrial white light that is restful to the eye, which enables quick visual response. It is a particularly efficient lamp in that it produces 14,000 lumens at a consumption of 400 watts or ap-

GE mercury vapor lamp suitable for high bay lighting

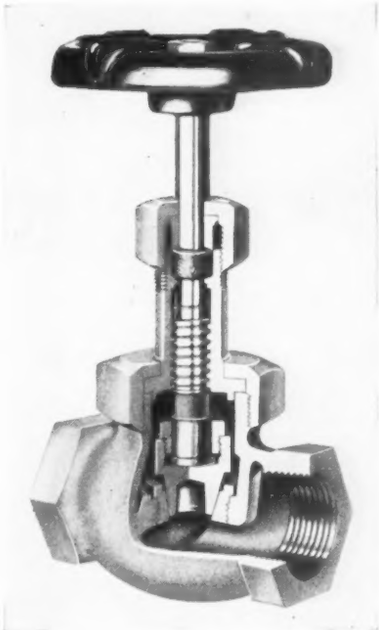
proximately 35 lumens per watt. It is made with a Mogul screw base for vertical mounting. The lamp has an over-all length of 13 inches and is designed for operation on 110-volt and 220-volt, 60-cycle circuits. It has an average life of 1500 hours.

From a technical standpoint the high intensity light is not white. It is a combination of blue light and yellow-green which produces a whiter sensation to the observer. Due to the practical absence of red rays in the light, true color values are not always rendered when red materials are involved, but this has no immediate bearing in the industrial field where fine color discrimination is rarely called for, the manufacturer brings out. The make-up of energy which gives the high intensity its color quality is interesting in that the major portion of energy is produced in the center of the visible spectrum (yellow-green area) to which eyes respond most efficiently.

• • •

Plug Type Valve—

Fairbanks Co., 393-99 Lafayette street, New York, recently brought out a plug valve, shown here-



Fairbanks plug type valve for service under adverse conditions

with, designed for service where there is excessive wire drawing or destructive action of any kind on the valve seat or disk, such as when used for drip, drain, throttling, etc. The long seating surface between the plug and the seat is said to insure added life. When these surfaces become scored or cut they can be readily reground or renewed if necessary.

Due to the angle of the plug and seat ring sealing surfaces, the stream flow is uniformly distributed when passing between these components. Manufacturers claim the force of the stream cannot be concentrated on any part of the plug or seat and produce erosion or wire drawing. The seat ring is screwed into the diaphragm, providing easy renewal. Both seat and disk are made of special nickel alloy of high brinnel hardness and can be reground indefinitely without removing the valve from the line. A shoulder on spindle affords a back seat which permits packing the stuffing box under pressure when the valve is wide open.

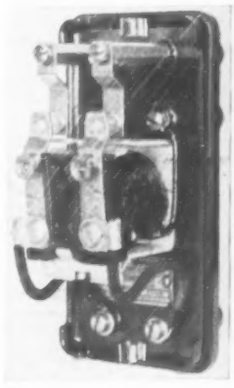
• • •

Auxiliary Relay—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recently announced a small, sturdy auxiliary relay, shown herewith, for use on alternating or direct current and suitable for switchboard or panel mounting. Both types have two independent contact circuits which may be adjusted easily for circuit-closing or circuit-opening service. For two independent opening circuits, additional material must be added to the standard relay.

Designed for continuous duty at rated voltage, the SK relay is obtainable for circuits up to 550 volts alternating current or 440 direct current. Ranges up to 250 volts can be used for intermittent duty up to approximately three times their continuous value. The relay can be supplied with a coil for any current value up to 5 amperes.

Relay is adapted for any thickness



Westinghouse auxiliary relay for alternating or direct current use and suitable for switchboard or panel mounting

of panel material from ⅛-inch (steel) to 2-inch (slate). The molded terminals are 1⅛ inches long, being ample for steel-panel mounting. For thicker panels, extension terminal studs are furnished. Each contact will carry 12 amperes continuous and 20 amperes for one minute.

• • •

Gyratory Riddle—

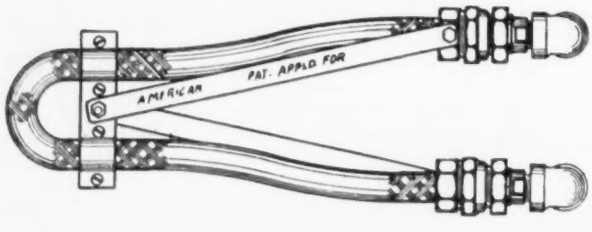
Newman Bros. Inc., Cincinnati, has developed a gyratory riddle which has a frame constructed of steel tubing with a riddle frame of cast steel. The machine has a gear drive and the motor may be removed easily for repairs. A ⅛-horsepower motor, either alternating or direct current may be used. The gyratory motion may be adjusted to suit particular conditions. The machine may be secured in any desirable height, depending upon the height of the ceiling.

• • •

Flexible Steam Connection—

American Brass Co., American Metal Hose Branch, Waterbury, Conn., recently brough out flexible seamless connections with brass bracket support for movable platen presses. The flexible tubing, the conducting element of the assembly, is seamless. It is made from a drawn tubing of special bronze. Deep helical corrugations die-formed into the tubing impart the necessary flexibility.

The bracket, as shown herewith, is attached to the flexible tubing in such a manner that flexing of the tubing is equal at all points and the tubing is held constantly in a horizontal position thus preventing sagging and the possibility of water pockets forming. The design is said to control the movement of the tubing within well defined limits. The assembly is applicable to either series or individually connected platens, and is manufactured in popular sizes for every travel.



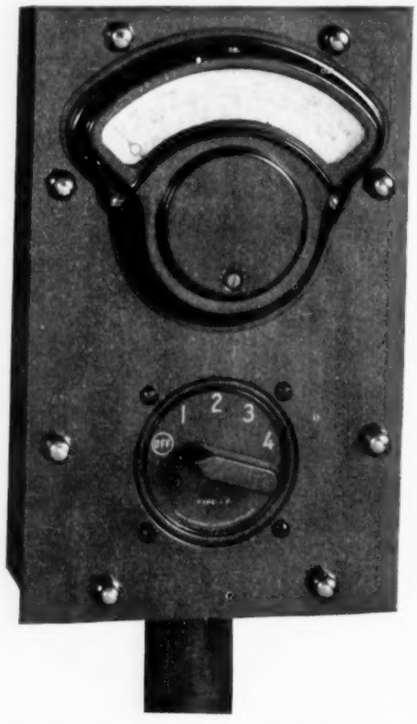
American flexible steam connection with brass support for movable platen presses

• • •

Low Resistance Pyrometer—

Thwing Instrument Co., 3339-41 Lancaster avenue, Philadelphia, recently brought out a type JR pyrometer developed to meet the increasing demand for a small size, low resistance pyrometer that is accurate for all commercial purposes. The unit, shown herewith, is especially suitable for use with small diesel engines, gas engines, batteries of soft metal pot furnaces, or wherever a small pyrometer is desired and where mounting space is limited.

The instruments are calibrated in two standard temperature ranges, 80 to 1200 degrees Fahr., and 80 to 2400 degrees Fahr. Other temperature ranges can be supplied to suit any industrial application. These pyrometers are furnished in two styles: Type JR multiple point pyrometer for indicating at a central point, temperatures from several sources; type JR individual pyrometer for indicating temperature from only one source.

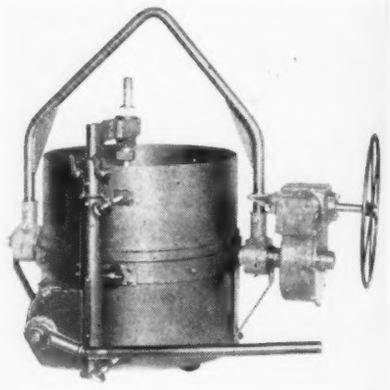


Thwing type JR pyrometer equipped with four-point switch

• • •

Bottom Pour Ladles—

Modern Equipment Co., Port Washington, Wis., recently has made changes in its line of bottom pour ladles for foundries. Mechanism for raising and lowering the stopper rod consists of an enclosed oil tight tubular slide of substantial construction to prevent a tendency to warp. The slide member is keyed to the casing to prevent any misalignment of the stopper rod. The entire mechanism is pivoted on the heavy ladle shank rather than on the bowl.



Bottom pour ladle built by Modern Equipment Co. in all standard sizes

Alignment is provided by adjusting screws above and below the pivot and by the swiveling of the goose neck fixeture which holds the stopper rod. The goose neck is adjusted and then clamped in place by two hand-screws as shown in the accompanying illustration. The stopper rod is adjustable vertically by a threaded section at the top and can be moved horizontally in the U shaped section at the front of the goose neck.

Raising and lowering is accomplished by a rack and pinion mechanism, and the stopper rod can be held in any position by the manual engagement of a dog and ratchet. The ladle can be supplied with or without the tipping gear and is built in all standard sizes.

• • •

Mobile Scoop Truck—

Baker-Raulang Co., Baker Industrial Truck division, 2168 West Twenty-Fifth street, Cleveland, recently brought out a new mobile scoop truck of 2500 pounds capacity. This unit, shown herewith, is designated type HFG and is especially adapted for handling all manner of loose material such as sand, clay, crushed stone, cinders, waste or scrap

material, or for loading coal into stoker hoppers in power plants not equipped with overhead bunkers.

In operation, on picking up a load, the lip of the bucket lies parallel to or on the ground and is pushed into the pile by the travel of the truck. The lifting mechanism is then put into operation which first tilts the bucket back into the carrying position and then raises it vertically to the desired height. In dumping, the carriage is raised to the extreme top of the uprights where it is automatically latched and the lift control is put in to the lowering position allowing the bucket to go forward and dump. In lowering, the operation is reversed—the bucket is brought back against the carriage, the carriage latch is released, and the bucket and carriage are lowered together.

The bucket is fabricated of ¼-inch steel plate, formed to shape and electrically welded with an additional wearing plate of chrome-manganese steel on the lip. Cubic capacity and shape of the bucket may be varied within reasonable limits to meet requirements and the height of lift and the dumping angle can be furnished to suit conditions. Storage battery or gasoline-electric power can be supplied as desired.

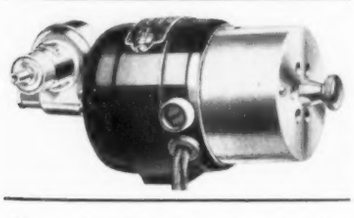
Baker-Raulang mobile scoop truck of 2500 pounds capacity

• • •

Governor-Controlled Motors—

Dumore Co., Racine, Wis., has brought out new electric governor-controlled motors in which the advantage of constant speed is combined with the light weight and power of series universal motors. Two new types are offered, the adjustable type on which the speed can be varied while the motor is in operation, and the fixed type which can be adjusted only when the motor is at standstill. Three sizes each of the two types are available for controlling the speed of motors rated 1/64 to ⅛ horsepower over a range of approximately 1000 to 7500 revolutions per minute.

The motor illustrated herewith is type XAL—1/25 horsepower with model CR 2-inch adjustable type governor. These motors are especially well adapted for operating apparatus where quick acceleration is required, yet where constant speed under varying load is necessary. The governor also serves to hold the motor speed constant, regardless of minor fluctuation in line voltage.

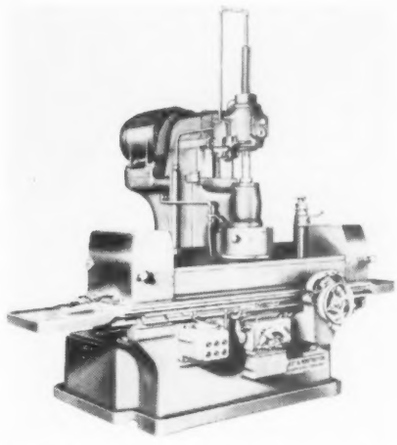


Dumore electric governor-controlled motor type XAL

• • •

Vertical Surface Grinder—

Pratt & Whitney Co., Hartford, Conn., has placed on the market a new 14-inch vertical surface grinder with hydraulic table drive, and table speeds from zero up to 100 feet a minute. This new model, shown herewith, is characterized by its increased weight and power, and by the much higher table speeds available.



Pratt & Whitney 14-inch hydraulic vertical surface grinder

The wheel used is 14 inches in diameter, 5 inches high and 1½ inches thick. It is held in a cast iron wheel mount which bolts to the spindle flange. A strong steel guard surrounds the wheel to prevent damage in case of accident. Wheel truing is accomplished by a built-in device on the end of the table. This is accurately graduated to save needless wheel waste.

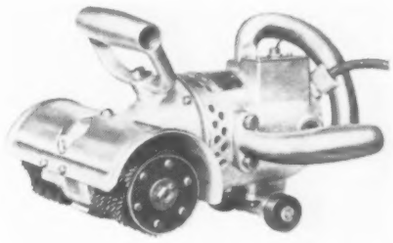
Wheel down feed mechanism is the ratchet wheel and pawl type, and produces power feeds ranging from 0.00025 to 0.005-inch at each end of the table stroke. In addition either a slow or a fast handwheel feed is engaged by pulling the handwheel in or out. The wheel head is mounted on broad vertical ways, with a narrow guide for accurate alignment.

The hydraulic mechanism is driven by a separate 5 horsepower motor mounted on a pad on the bed on the right rear side. Oil for the hydraulic system is carried in a tank in the base of the column. The control valve and lever are on the front of the bed under the operator's hand, and vary the table speed from zero up to 100 feet a minute. Two adjustable stops are provided for quickly setting of particular speeds if desired. Automatic table reversing takes place at any desired point by dogs which are instantly adjustable along a longitudinal rack on the front of the bed. The table may be reversed easily by hand, if desired.

• • •

Cleaning Tool—

Concrete Surfacing Machinery Co., Cincinnati, is announcing a new cleaning tool for removing heavy rust, scale and foreign accumulations. It thoroughly cleans the surface and all pitted cavities, leaving the surface in a perfect condition for the adhesion of new paint.



Model M cleaning tool introduced by Concrete Surfacing Machinery Co.

Impacts at the rate of 115,000 per minute of seventy-two loose cutters mounted into cutter bundles, thrown out by centrifugal force, accomplish the desired cleaning results. The degree of impact is regulated by a depth shoe, easily adjusted. The tool is simple to operate. Electric model "M" illustrated herewith, is equipped with a ½ horsepower universal motor.

A.I.M.E. Meeting Studies Steelmaking Practice

(*Concluded from Page 56*)

felt on tempering at about 550 degrees Cent. Only with the increasing of the quenching temperature does the effect of vanadium appear also on tempering at 600 degrees Cent.

It is evident, therefore, that an addition of vanadium to constructional steels will produce no effect on the mechanical properties unless the quenching temperature is raised so as to utilize the influence of the vanadium carbide. The only effect of an addition of vanadium to constructional steels quenched from normal temperatures is to produce a fine grain, owing to the retardation in grain growth in the austenite by carbide particles. The finer grain of vanadium steels causes a higher ratio of yield point to tensile strength.

Discussing the plasticity of iron at low temperatures, K. Heindlhofer, research laboratory, United States Steel Corp., Kearny, N. J., presented data taken under notched-bar impact, tensile and torsion tests and observed that the indications of these tests could not be identical because the relative values of the three principal stresses acting upon the specimen were entirely different in these three types of tests. The phenomena indicate, he said, that, as the temperature falls, at least below ordinary temperature, the true cohesive strength of material increases more slowly than it does in shearing strength; in other words, that the relation between these two quantities changes. This suggests, he concluded, that a mechanical test of different materials, or even of the same material at different temperatures does not necessarily yield comparable deductions as to the inherent properties of the material.

Metallurgical effects produced in steel by fusion welding were enumerated in a paper by A. B. Kinzel, chief metallurgist, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y. The heat of welding produces no noteworthy metallographic effect except in the dome immediately adjacent to the scarf of the weld. In this zone, he said, the ductility is reduced, but the tensile strength is increased. If desired, this zone can be completely eliminated by local normalizing.

Benefits of Normalizing

The minimum tensile strength in a welded joint exists, he continued, in the zone subjected to the maximum subcritical temperature. This zone is not necessarily effective in reducing the strength of the joint as a whole. The high ductility of this zone, combined with a small decrease in tensile strength, permits its engineering use at the same fiber stress as that of the plate proper. This zone can be eliminated by general normalizing, he said.

Commercial plate used for welding purposes is generally susceptible to strain-age brittleness. This may be produced, Mr. Kinzel stated, by cold-working the plate before welding, or by internal stress due to the combination of restraint and steep temperature gradients in the welding operation. This can be completely eliminated by general stress relieving. Steep temperature gradients may do permanent damage to welded steel. The problem does not exist for procedure-controlled oxyacetylene welding, as such steep temperature gradients are never produced. In some other types of welding, he concluded, the deleterious effect can be avoided to some extent by proper design.

A simple method for determining the solubility of nitrogen in liquid iron has been devised, according to John Chipman and D. W. Murphy, department of engineering research, University of Michigan, Ann Arbor, Mich., who outlined details and presented certain results. The solubility, at approximately 740 millimeters pressure, was found, under the procedure followed, to be 0.039 per cent, just above the melting point and 0.042 per cent at 1760 degrees Cent. (3200 degrees Fahr.) Within the limits of experimental error, the solubility was not affected by 0.15 per cent aluminum or by 0.70 per cent silicon.

The rate of solution of nitrogen in liquid iron was not greatly affected by temperature, the authors stated. The presence of aluminum or silicon in the melt exerted a very great influence upon the rate of the solution, the rate coefficient being increased ten-fold to twenty-fold in two experiments in which these elements were present.

Copper Helps Malleable Iron

Discussing some effects of copper in malleable iron, Cyril S. Smith and Earl W. Palmer, copper alloys research laboratory, American Brass Co., Waterbury, Conn., declared that by dilatometric and other methods the addition of copper had been found to accelerate both first-stage and second-stage graphitization of white cast iron. The effect, the authors stated, is roughly proportional to the amount of copper added and 1.0 per cent of copper results in a reduction of graphitization time by about 50 per cent, although this is affected by the rate of heating and other factors.

The addition of 1.0 to 1.5 per cent of copper increases the yield point of malleablized iron to the extent of about 10,000 pounds per square inch, and a further gain of 10,000 to 15,000 pounds per square inch can be obtained by subjecting the castings to a precipitation hardening treatment. This consists, they concluded, of heating to a temperature closely below the critical point, air cooling and reheating at about 500 degrees Cent. The increase in tensile strength is accompanied by some loss in ductility.

Trade Publications

WELDING—Lincoln Electric Co., Cleveland, in its series of studies in structural arc welding has issued plate No. 48, devoted to fixed end connections, beams to columns, in arc-welded tier buildings. Sketches show methods of connecting.

TEMPERATURE INDICATORS—General Electric Co., Schenectady, N. Y., in its bulletin No. 1075A describes its new temperature-indicating equipment for alternating current generators, motors and transformers, operating from a standard alternating circuit. It is illustrated and presents diagrams of wiring.

LUBRICATION — Acheson Colloids Corp., Port Huron, Mich., is distributing technical bulletin No. F220, dealing with graphoid surfaces and the part they play in lubrication. It deals with the formation of graphoid surfaces after adding colloidal graphite to lubricating oils.

DRILLS, REAMERS—National Twist Drill & Tool Co., Detroit, has issued its catalog No. 15, in which it has segregated carbon and high-speed steel drills, with tinted paper to exxpedite use of the pages. An engineering data book is included, with rules, formulas and tables for users of tools.

ELECTRICAL EQUIPMENT—General Electric Co., Schenectady, N. Y., has issued several bulletins. No. 1075A covers its temperature-indicating equipment for alternating current generators, motors and transformers, No. 2030 presents its line of oil fuse cutouts. No 1488A is devoted to its MC-5 air circuit breaker for frequent operation and severe duty.

INDUSTRIAL EQUIPMENT—L. O. Koven & Bro. Inc., 154 Ogden avenue, Jersey City, N. J., has issued a catalog outlining services to the industrial field by this concern. Full illustrations cover equipment designed by the company's engineers for plate and sheet metal construction in all commercial metals and methods of construction.

PUMPS—Worthington Pump & Machinery Corp., Harrison, N. J., has issued bulletins on types L and R, single-stage volute, and type UC three-stage volute centrifugal pumps, and one on its steam booster compressors. Its bulletin S-500-B6D is devoted to its vertical four-cycle direct-injection diesel engine, one to eight cylinders, 25 to 1000 horsepower.

CARBOLOY—Carboloy Co. Inc., Detroit, has issued a booklet of information on the profitable use of carboloy tools. This is booklet SC-35. It presents benefits from the use of carboloy tools, explanation of the size of plants which can use this material profitably, educational work needed, methods of purchase, materials economically machined, physical characteristics and similar information.

Steel Rate Rises to 50% on Broader Demand

Structural, Pipe Outlook Better; Light Products Still Strong

> ***THE MARKETS IN TABLOID***
>
> **DEMAND** . . . Strong for flat-rolled. Pipe, structurals improving.
>
> **PRICES** . . . Steel and pig iron unchanged. Scrap steadier.
>
> **PRODUCTION** . . . Ingot output up; sheet mills 75 per cent; tin plate 80.
>
> **SHIPMENTS** . . . Sustained for sheets and strip; less pressure for heavier products.

SUSTAINED shipments and consumption of flat-rolled steel, plus a moderately broadening demand for structural steel and pipe have not only checked the three consecutive weekly declines in steelworks operations, but also have lifted the national average 2 points to 50 per cent.

Sheet and strip mills, operating at 75 per cent, have accumulated sufficient backlogs, mainly from automobile manufacturers, to continue at this level five to six weeks, with specifications extending as far ahead as May. Automobile assemblies last week increased to 86,000 units from 83,900 in the preceding week, and the industry now estimates second quarter production will carry on at 300,000 to 400,000 per month.

Higher prices for farm products are stimulating demand for agricultural implements, manufacturers experiencing their best operations in five years.

The two leading can manufacturers have consumed more tin plate so far this year than in any similar period in their history, and tin plate mill operations are scheduled for an advance from the current rate of 80 per cent.

Award of 10,000 tons of 6-inch pipe for a 20,-mile line for the Champlin Refining Co., Enid, Okla., to Youngstown Sheet & Tube Co., and distribution of 9100 tons of 10¾-inch pipe for an 80-mile line in California for the General Petroleum Corp., Los Angeles, are among the first important pipe-line projects in several years. Texas is making strong efforts to obtain federal aid to lay two parallel gas lines to St. Louis and Detroit, which would take 415,000 tons of steel.

Inquiries for structural steel are increasing as spring approaches, though actual awards last week at 9242 tons showed little change. Releases of considerable sheet piling has advanced Pittsburgh shape mill operations. This week bids will be opened on 33,000 tons of steel for the Triboro, New York, bridge.

Some of the leading railroads which were counted on to supply more than 100,000 tons of rails to mills this spring indicate they may defer purchases until fall. New York Central is placing 20,000 tons, and Atlantic Coast Line has awarded 5000 tons. February freight car awards of 806 brought the total for two months to 830, against 19,877 in the same period last year.

Tending to destroy confidence and delay a great volume of business are the national political squabbles now in progress. Attacks against utility holding companies are freezing purchases of power generating equipment. Undoubtedly, some steel tonnage also is being held back through the possibility of a termination to NRA, and with it the steel code, which some consumers reason might lead to a break in prices.

A sharp decline in scrap shipments in January was mainly accountable for a decrease of 7 per cent in iron and steel exports to 262,740 tons, although this was 85,000 tons more than in the month last year. Imports were up 15.6 per cent to 22,784 tons.

Steel ingot production in February averaged 114,255 gross tons daily, 8.8 per cent above January, and highest since June last year. With fewer working days, total output for the month was 2,742,125 tons, down 92,045 tons. For the two months this year, 5,576,295 tons, is 34 per cent larger than the tonnage made in the first two in 1934.

Chicago steelworks operations last week advanced 2 points to 55 per cent; Pittsburgh 1 to 38; Wheeling 14 to 92; Youngstown 5 to 55. Birmingham held at 55½; Cleveland 74; while New England was down 2 points to 61; eastern Pennsylvania 1 to 28½; Buffalo 2 to 38, and Detroit 6 to 94.

STEEL's iron and steel price composite is reduced 3 cents to $32.40; finished steel unchanged at $54, while the scrap index is down 12 cents to $11.04.

COMPOSITE MARKET AVERAGES

	March 9	March 2	Feb. 23	One Month Ago Feb., 1935	Three Months Ago Dec., 1934	One Year Ago March, 1934	Five Years Ago March, 1930
Iron and Steel	$32.39	$32.42	$32.50	$32.54	$32.39	$31.38	$34.79
Finished Steel	54.00	54.00	54.00	54.00	54.00	51.10	54.88
Steelworks Scrap	11.04	11.15	11.58	11.66	11.02	12.30	14.52

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	March 9, 1935	Feb., 1935	Dec., 1934	Mar., 1934
Steel bars, Pittsburgh	1.80c	1.80c	1.80c	1.75c
Steel bars, Chicago	1.85	1.85	1.85	1.80
Steel bars, Philadelphia	2.09	2.09	2.09	2.04
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.60
Shapes, Pittsburgh	1.80	1.80	1.80	1.70
Shapes, Philadelphia	2.00½	2.00½	2.00½	1.90½
Shapes, Chicago	1.85	1.85	1.85	1.75
Tank plates, Pittsburgh	1.80	1.80	1.80	1.70
Tank plates, Philadelphia	1.98½	1.98½	1.98½	1.88½
Tank plates, Chicago	1.85	1.85	1.85	1.75
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.75
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.25
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	2.85
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.85
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.35
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	2.95
Plain wire, Pittsburgh	2.30	2.30	2.30	2.20
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.35

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$26.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	26.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	26.00
Wire rods, Pittsburgh	38.00	38.00	38.00	36.00

Pig Iron

	March 9, 1935	Feb., 1935	Dec., 1934	Mar., 1934
Bessemer, del. Pittsburgh	$19.76	$19.76	$19.76	$19.26
Basic, Valley	18.00	18.00	18.00	17.00
Basic, eastern, del. eastern Pa.	19.76	19.76	19.76	18.76
No. 2, foundry, del. Pittsburgh	19.26	19.26	19.26	18.76
No. 2, foundry, Chicago	18.50	18.50	18.50	17.50
Southern No. 2, Birmingham	14.50	14.50	14.50	13.50
No. 2X eastern, del. Philadelphia	20.63	20.63	20.63	19.63
Malleable, Valley	18.50	18.50	18.50	17.50
Malleable, Chicago	18.50	18.50	18.50	17.50
Lake Superior charcoal, del. Chi.	24.04	24.04	24.04	23.54
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	90.24
Gray forge, del. Pittsburgh	18.63	18.63	18.63	18.38

Scrap

Heavy melting steel, Pittsburgh	$12.50	$13.25	$12.95	$14.35
Heavy melt. steel, No. 2, east, Pa.	9.25	10.12	9.30	9.70
Heavy melting steel, Chicago	10.75	11.65	10.55	12.00
Rails for rolling, Chicago	11.75	12.55	11.65	12.75
Railroad steel specialties, Chicago	11.75	12.50	11.90	13.00

Coke

Connellsville, furnace, ovens	$3.60	$ 3.60	$3.60	$3.35
Connellsville, foundry, ovens	4.60	4.60	4.60	4.25
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Prices are code levels filed with American Iron and Steel Institute, 350 Fifth avenue, New York. Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.18c
Philadelphia, del	2.14c
Birmingham	2.00c
St. Louis, del.	2.17c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.39c
New York, del.	3.43c
Birmingham	3.25c
St. Louis, del.	3.42c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.07c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.79c
New York, del.	2.83c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.24c
New York, del.	3.28c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.08c
Philadelphia, del.	1.98½c
Boston, delivered	2.20c
Buffalo, delivered	2.03½c
Chicago or Gary	1.85c
Cleveland, del.	1.98½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.07c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.00½c
New York, del.	2.05½c
Boston, delivered	2.18½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	1.98½c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

Pittsburgh	1.80c
Chicago or Gary	1.85c
Duluth	1.95c
Birmingham	1.95c
Cleveland	1.85c
Buffalo	1.90c
Detroit, delivered	1.95c
Pacific Coast ports cars, dock, c.i.f.	2.35c
Philadelphia, del.	2.09c
Boston, delivered	2.20c
New York, del.	2.13c
Pitts., forg. qual.	1.95c-2.05c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

IRON

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.89c
Pittsburgh, refined	2.75-7.50c

REINFORCING

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.34c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; pool cars, or less, 15c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pitts.-Cleve. 100 lb. keg

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs and over	1.97½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20
4100	0.15 to 0.25 Mo.		0.50
4600	0.20 to 0.30 Mo. 1.25 1.75 Ni.		1.05
5100	0.80-1.10 Cr		0.45
5100	Cr. spring		base
6100	bars		1.20
6100	spring		0.70
Cr., Ni., Van.			1.50
Carbon Van.			0.95
9250	Carbon base plus extras		

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23½-in. Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base,	2.00c
Detroit, delivered	2.05c
Phila., delivered	2.14c
New York, del.	2.18c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light Rails billet qual, Pitts., Chi.	$35.00
Do., reroll. qual.	$34.00
Angle bars, mills	2.55c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

CARRIAGE BOLTS

All sizes, cut thread	70-10-5 off
Rolled thread, ½ x 6 smaller	70-10-5 off

MACHINE BOLTS

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts,	70-10-5 off
Tire bolts	60-5 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch	
Rolled thread machine bolts, ½ x 6 and smaller	70-10-5 off
Step bolts	70-5 off
Elevator bolts	70-5 off

NUTS

S.A.E. semifinished hex.; ½ to ⅞-inch	70-10-5 off
Do., ½ to 1-inch	70-10-5 off
Do., over 1-inch	70-5 off

HEXAGON CAP SCREWS

Milled	85 off
Upset, 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

Upset, 1-in. small	70-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila.	6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

Steel

In.	Blk.	Gal.
⅛ and ¼	53½	35
⅜	58½	47
½	62	52
¾	64	55
1—3	64	55

Iron

⅛	31½	15
¼	36½	20½
⅜	39½	25½
½	41½	26

LAP WELD

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE

Steel

⅛, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½ inch, black and galv. take 4 pts, over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

SEAMLESS BOILER TUBES

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$38.00-39.00
4-in., Birmingham	41.00-42.00
4-in., Chicago	49.00-50.00
6 to 24-in., Chicago	46.00-47.00
6-in. & over, east fdy.	42.00
Do., 4-in.	45.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel

BILLETS AND BLOOMS

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.30
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

SHEET BARS

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

SLABS

Pitts., Cleve., Young.	27.00

WIRE RODS

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

SKELP

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

BEEHIVE OVENS

Connellsville, fur.	$3.60- 3.85
Connellsville, fdry.	4.60
Connel. prem. fdry.	5.10
New River fdry.	6.00
Wise county fdry	4.45- 5.25
Wise county fur.	4.00- 4.50

BY-PRODUCT FOUNDRY

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.00

Coke By-Products

Per gallon, producers' plants.

Tank lots	Spot
Pure and 90% benzol	15.00c
Toluol	30.00c
Solvent naphtha	26.00c
Commercial xylol	26.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls.	5.00c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Po.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del...	14.50	14.50	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Granite City, Ill.	18.50	18.50	18.00	.....
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.02	.....	19.90	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.77	22.27	.....	.....
Brooklyn, N. Y., from Bmgham..	21.30	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.13	.....	19.01	.....
Cleveland from Birmingham	18.62	.....	18.50	.....
Indianapolis from Hamilton, O...	20.77	20.77	20.27	21.27
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.50	19.50	19.00	20.00
Muskegon, Mich., from Chicago, Toledo or Detroit	21.40	21.40	20.90	21.90
Newark, N. J., from Birmingham	20.51	.....	.....	.....
Newark, N. J., from Bethlehem..	20.89	21.39	.....	.....
Philadelphia from Birmingham..	19.88	.....	19.76	.....
Philadelphia from Swedeland, Pa.	20.26	20.76	19.76	.....
Pittsburgh district from Neville Island	Neville base plus 63c, 76c and $1.13 switching charges			
Saginaw, Mich., from Detroit	20.60	20.60	20.10	21.10

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis from Granite City, Ill.	19.00	19.00	18.50	.....
St. Louis from Birmingham	18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63.

Gray Forge		Charcoal	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.04

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

First Quality.

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00
Second Quality	
Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00
Ohio	
First quality	$40.00-45.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	42.50
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$19.50
*Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$13.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	89.79
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent Spot, $5 a ton higher.	126-130.00
Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply

Nonferrous Prices

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: Futures	Lead: New York N. Y.	Lead: East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Mar. 2	9.00	9.12½	7.50	47.37½	47.12½	3.55	3.40	3.85	*19.00	14.50	35.00
Mar. 4	9.00	9.12½	7.50	47.35	47.00	3.55	3.40	3.85	*19.00	14.50	35.00
Mar. 5	9.00	9.12½	7.50	47.25	46.87½	3.55	3.40	3.87½	*19.00	14.50	35.00
Mar. 6	9.00	9.12½	7.50	46.60	46.37½	3.55	3.40	3.90	*19.00	14.50	35.00
Mar. 7	9.00	9.12½	7.50	46.70	46.50	3.55	3.40	3.90	*19.00	14.50	35.00
Mar. 8	9.00	9.12½	7.50	47.20	47.20	3.55	3.40	3.90	*19.00	14.50	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c *Conn. copper.*

Sheets

Yellow brass (high)	14.25
Copper, hot rolled	16.00
Lead, cut, to jobbers	7.25
Zinc, 100-lb. base	9.50

Tubes and Pipes

High yellow brass	16.00
Seamless copper	16.25

Rods

High yellow brass	12.75
Copper, hot rolled	13.25

Anodes

Copper, untrimmed	13.75

Wire

Yellow brass (high)	14.75

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass

New York	4.25- 4.50
*Cleveland	5.00- 5.50
Chicago	4.37½-4.62½
St. Louis	4.75- 5.00

Heavy Copper and Wire

New York	5.75- 6.00
Chicago, No. 1	5.37½-5.62½
*Cleveland	5.75- 6.00
St. Louis	5.25- 5.50

Composition Brass Borings

New York	3.75- 4.00

Light Copper

New York	4.50- 4.75
Chicago	4.12½-4.37½
*Cleveland	5.00- 5.25
St. Louis	4.75- 5.00

Light Brass

Chicago	2.12½-2.37½
*Cleveland	2.50- 2.75

Lead

New York	2.70- 2.80
Cleveland	2.50- 2.75
Chicago	2.50- 2.75
St. Louis	2.65- 2.75

Zinc

*New York	1.87½-2.12½
*Cleveland	2.00- 2.50
St. Louis	2.25- 2.40

Aluminum

Borings, Cleveland	7.25- 8.00
Mixed, cast, Clev.	11.50-12.00
Mixed, cast, St. L.	12.75-13.00
Clips, soft, Clev.	14.00-14.50

SECONDARY METALS

Brass ingot, 85-5-5-5	8.25
Stand. No. 12 Alum.	16.00-17.00

Iron and Steel Scrap Prices

Corrected to Friday night Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.00- 9.50
Boston, dock, expt.	9.00
Boston, domestic	7.25- 7.50
Buffalo, No. 1	11.00-11.25
Buffalo, No. 2	9.50-10.00
Chicago, No. 1	10.50-11.00
Cleveland, No. 1	10.25-10.75
Cleveland, No. 2	9.75-10.25
Detroit, No. 1	8.00- 8.50
Detroit, No. 2	7.00- 7.50
Eastern Pa., No. 1	11.00
Eastern Pa., No. 2	9.00- 9.50
Federal, Ill.	8.00- 8.25
Granite City, R. R.	8.75- 9.25
Granite City, No. 2	7.25- 7.75
N. Y., deal. No. 2	7.75- 8.00
N. Y., deal. barge	9.25- 9.50
Pittsburgh, No. 1	12.25-12.75
St. Louis	8.00- 8.50
Valleys, No. 1	13.00-13.25

COMPRESSED SHEETS □

Buffalo, dealers	9.50-10.00
Chicago, factory	9.50-10.00
Chicago, dealer	9.00- 9.50
Cleveland	10.25-10.75
Detroit	8.00- 8.50
E. Pa., new mat.	10.00-10.50
Pittsburgh	11.75-12.25
St. Louis	7.00- 7.50
Valleys	12.25-12.50

BUNDLED SHEETS □ □

Buffalo	8.00- 8.50
Cincinnati, del.	6.00- 6.50
Cleveland	8.00- 8.50
Pittsburgh	10.75-11.25
St. Louis	5.00- 5.50

SHEET CLIPPINGS, LOOSE □

Chicago	6.00- 6.50
Cincinnati	5.50- 6.00
Detroit	5.00- 5.50
St. Louis	5.00- 5.50

STEEL RAILS, SHORT □

Birmingham	12.00-12.50
Buffalo	12.50-13.00
Chicago (3 ft.)	12.50-13.00
Chicago (2 ft.)	13.50-14.00
Cincinnati, del.	11.50-12.00
Detroit	11.00-11.50
Pitts., open-hearth, 3 ft. and less	14.00-14.50
St. Louis, 2 ft. & less	12.50-13.00

STEEL RAILS, SCRAP □

Boston	7.00- 7.25
Chicago	10.50-11.00
Pittsburgh	12.75-13.25

STOVE PLATE □ □

Birmingham	6.00- 6.50
Boston, dealers	3.75- 4.00
Buffalo	9.25- 9.75
Chicago, net	6.50- 7.00
Cincinnati, dealers	5.50- 6.00
Detroit, net	5.75- 6.25
Eastern Pa.	8.50- 9.00
N. Y., deal. fdry.	6.00
St. Louis	5.50- 6.00

COUPLERS, SPRINGS

Buffalo	13.25-13.75
Chicago, springs	11.50-12.00
Eastern Pa.	14.00-14.50
Pittsburgh	14.00-14.50
St. Louis	10.50-11.00

ANGLE BARS—STEEL □

Chicago	11.50-12.00
St. Louis	11.00-11.50

RAILROAD SPECIALTIES

Chicago	11.50-12.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	13.25-13.75
Cleveland, billet, bloom crops	14.50-15.00
Eastern Pa., crops	14.50
Pittsburgh, billet, bloom crops	14.00-14.50
Pittsburgh, sheet bar crops	13.00-13.50

FROGS, SWITCHES □ □

Chicago	10.50-11.00
St. Louis, cut	10.50-11.00

SHOVELING STEEL □ □

Chicago	10.50-11.00
Federal, Ill.	8.00- 8.50
Granite City, Ill.	7.50- 8.00

RAILROAD WROUGHT □

Birmingham	7.50- 8.00
Boston, dealers	6.00- 6.50
Buffalo, No. 1	9.00- 9.50
Buffalo, No. 2	11.00-11.50
Chicago, No. 1, net	9.00- 9.50
Chicago, No. 2	10.50-11.00
Cincinnati, No. 2	8.00- 8.50
Eastern Pa.	11.00-11.50
N. Y., No. 1, deal.	7.50- 8.00
St. Louis, No. 1	7.00- 7.50
St. Louis, No. 2	9.75-10.25

SPECIFICATION PIPE □

Boston	3.00- 3.25
Eastern Pa.	9.50
New York, dealers	3.50- 4.00

BUSHELING □ □

Buffalo, No. 1	9.50-10.00
Chicago, No. 1	9.00- 9.50
Cinci., No. 1, deal.	6.00- 6.50
Cincinnati, No. 2	2.75- 3.25
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1, new	7.00- 7.50
Valleys, new, No. 1	12.00- 12.50

MACHINE TURNINGS □

Birmingham	4.50- 5.00
Boston, dealers	2.00- 2.25
Buffalo	6.00- 6.50
Chicago	6.00- 6.50
Cincinnati, dealers	3.50- 4.00
Cleveland	7.00- 7.50
Detroit	4.00- 4.50
Eastern Pa.	6.00- 6.50
New York, dealers	2.75- 3.25
Pittsburgh	7.50- 8.00
St. Louis	3.50- 4.00
Valleys	8.50- 9.00

BORINGS AND TURNINGS □

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	6.50- 7.00
Cincinnati, dealers	4.50- 5.00
Cleveland	7.50- 8.00
Detroit	5.25- 5.75
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	7.00- 8.00

CAST IRON BORINGS

Birmingham, plain	4.50- 5.00
Boston, chemical	6.00- 7.00
Boston, dealers	3.25- 3.50
Buffalo	6.50- 7.00
Chicago	6.00- 6.50
Cincinnati, dealers	3.50- 4.00
Cleveland	7.50- 8.00
Detroit	5.25- 5.75
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
Pittsburgh	7.00- 8.00
St. Louis	3.00- 3.50

PIPE AND FLUES □ □

Cincinnati, dealers	5.00- 5.50

RAILROAD GRATE BARS □

Buffalo	7.00- 7.50
Chicago, net	6.00- 6.50
Cincinnati	4.00- 4.50
Eastern Pa.	9.00
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS □ □

Boston, dealers	5.25- 5.50
Buffalo	9.50-10.00
Cleveland	8.50- 9.00
Detroit	7.00- 7.50

FORGE SCRAP □ □

Boston, dealers	5.50- 6.00
Chicago, heavy	11.00-11.50
Eastern Pa.	10.00

ARCH BARS, TRANSOMS

St. Louis	12.25-12.75

AXLE TURNINGS □ □

Boston, dealers	3.00- 3.50
Buffalo	7.50- 8.00
Chicago, elec. fur.	10.00-10.50
Cleveland	7.50- 8.00
Eastern Pa.	9.50
St. Louis	6.50- 7.00

STEEL CAR AXLES □ □

Birmingham	12.50-13.00
Boston, ship. point.	10.00-10.50
Buffalo	13.25-13.75
Chicago, net	14.00-14.50
Eastern Pa.	16.50-17.00
St. Louis	14.00-14.50

SHAFTING □ □

Boston, ship. point.	12.25-12.50
Eastern Pa.	17.50
New York, dealers	12.50-13.00
St. Louis	11.50-12.00

CAR WHEELS

Birmingham	9.00- 9.50
Boston, iron deal.	6.00- 6.50
Buffalo, iron	11.00-11.50
Buffalo, steel	13.00-13.50
Chicago, iron	11.00-11.50
Chicago, rolled steel	11.50-12.00
Cincinnati, iron	8.00- 8.50
Eastern Pa., iron	10.50-11.00
Eastern Pa., steel	14.50-15.00
Pittsburgh, iron	12.00-12.50
Pittsburgh, steel	14.00-14.50
St. Louis, iron	9.00- 9.50
St. Louis, steel	10.50-11.00

No. 1 CAST SCRAP □ □

Birmingham	9.50-10.00
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	7.50
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	10.50-11.00
Buffalo, mach.	11.50-12.00
Chicago, agri. net	8.00- 8.50
Chicago, auto	9.50-10.00
Chicago, mach. net	9.50-10.00
Chicago, railr'd net	8.50- 9.00
Cinci., mach. cup	8.50 9.00
Cleveland, cupola	12.00-12.50
Detroit, net	9.50-10.00
Eastern Pa., cupola	11.50-12.00
Pittsburgh, cupola	12.50-13.00
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	8.50- 9.00
St. L., No. 1 mach.	10.00-10.50

HEAVY CAST □ □

Boston, del.	6.00- 6.25
Buffalo, break.	9.00- 9.50
Cleveland, break.	9.00- 9.50
Detroit, auto net	10.50
Detroit, break.	7.00- 7.50
Detroit, auto net	9.50-10.00
Eastern Pa.	10.50-11.00
N. Y. break. deal.	6.00- 6.50
Pittsburgh	11.50-12.00

MALLEABLE □ □

Boston, consum.	10.00-10.50
Buffalo	12.50-13.00
Chicago, R. R.	13.25-13.75
Cincinnati, agri. del.	8.25- 8.75
Cleveland, rail	12.50-13.00
Detroit, auto	11.00-11.50
St. Louis, R. R.	10.00-10.50
Eastern Pa., R. R.	11.00-11.50

RAILS FOR ROLLING □

5 feet and over

Birmingham	11.00-11.50
Boston, dealers	8.00- 8.50
Buffalo	11.00-11.50
Chicago	11.50-12.00
Eastern Pa.	12.50-13.00
New York, dealer	7.50- 8.00
St. Louis	10.75-11.25

LOCOMOTIVE TIRES □

Chicago (cut)	11.50-12.00
St. Louis, No. 1	10.00-10.50

LOW PHOS. PUNCHINGS □

Buffalo	13.25-13.75
Chicago	12.50-13.00
Eastern Pa.	14.00
Pittsburgh	14.00-14.50

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbes.	4.65

Eastern Local Ores

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Copper-free low phos. 58 60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.,	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.50

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	2.90c
Boston††	2.95c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.15c
Cleveland	2.95c
Detroit	3.03½c
Houston	3.00c
Los Angeles	3.70c
Milwaukee	3.06c
New Orleans	3.30c
New York‡(d)	3.22c
Pittsburgh(h)	2.90c
Philadelphia*	2.90c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.19c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS

Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.00c
Chicago	2.75c
Cincinnati	3.15c
New York‡(d)	3.32c
Philadelphia*	2.90c
St. Louis	3.19c
Tulsa	3.25c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.15c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.50c
St. Louis	3.24c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	2.95c
Boston††	3.17c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland	3.31c
Detroit	3.40c
Houston	3.00c
Los Angeles	3.70c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

PLATES

Baltimore*	2.95c
Boston††	3.18c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland, ¼-in. and over	3.31c
Detroit	3.46c
Detroit, 3/16-in.	3.65c
Houston	3.00c
Los Angeles	3.70c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.95c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	3.05c
Boston††	3.25c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.20c
Cleveland	3.11c
Det., 8-10 ga.	3.13½c
Houston	3.35c
Los Angeles	3.80c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.27c
Portland	3.75c
Philadelphia*	3.05c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK

Baltimore*†	3.51c
Boston (g)	3.90c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.05c
Cleveland	3.91c
Detroit	3.98½c
Los Angeles	4.45c
Milwaukee	3.96c
New York	3.85c
Philadelphia*†	3.55c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.09c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GALV. SHEETS

Baltimore*†	4.21c
Buffalo	4.00c
Boston (g)	4.60c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.70c
Cleveland	4.61c
Detroit	4.70c
Houston	4.40c
Los Angeles	5.05c
Milwaukee	4.66c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.25c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.79c
St. Paul	4.19c
Tulsa	5.10c

BANDS

Baltimore*	3.15c
Boston††	3.25c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.45c
Cleveland	3.36c
Detroit, 3/8-in. and lighter	3.38½c
Houston	3.25c
Los Angeles	3.90c
Milwaukee	3.41c
New Orleans	3.95c
New York(d)	3.62c
Philadelphia	3.15c
Pittsburgh(h)	3.20c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Louis	3.54c
St. Paul	3.20c
Tulsa	3.45c

HOOPS

Baltimore	2.30c
Boston	4.25c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.45c
Det., No. 14 and lighter	3.38½c
Milwaukee	3.41c
New York	3.62c
Philadelphia	3.40c
Pittsburgh(h)	3.70c
Seattle	5.60c
St. Louis	3.54c
St. Paul	3.75c

COLD. FIN. STEEL

Baltimore (c)	3.71c
Boston	3.85c-4.00c
Buffalo (h)	3.55c
Chattanooga*	4.06c
Chicago (h)	3.50c
Cincinnati	3.70c
Cleveland (h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	4.95c
Milwaukee	3.61c
New Orleans	4.30c
New York	3.92c-4.42c
Philadelphia	3.73c
Pittsburgh(h)	3.45c
Portland (f)	4.75c
San Fran.(f)(d)	5.95c
Seattle(f) (d)	4.75c
St. Louis	3.74c
St. Paul	3.20c
Tulsa	4.65c

COLD ROLLED STRIP

Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati(b)	3.42c
Cleveland (b)	3.20c
Detroit	3.33c
New York	4.70c
St. Louis	3.36c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs. extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, March 7

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$14.61 3 1 6	$15.30	1 16 0
Basic bessemer	13.06 2 15 0*	13.59	1 12 0
Hematite, Phos. .03-.05	14.84 3 2 6	.....	.....
SEMIFINISHED STEEL			
Billets	$26.13 5 10 0	$19.96	2 7 0
Wire rods, No. 5 gage	37.05 7 16 0	38.24	4 10 0
FINISHED STEEL			
Standard rails	$36.81 7 15 0	$46.74	5 10 0
Merchant bars	1.59c 7 10 0	1.20c to 1.26c	3 2 6 to 3 5 0
Structural shapes	1.56c 7 7 6	1.19c	3 1 6
Plates, †¼ in. or 5 mm.	1.70c 8 0 0	1.59c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	1.96c 9 5 0	2.23c	5 16 0
Sheets, gal., 24 gage, corr.	2.39c 11 5 0	2.49c	6 10 0
Bands and strips	1.80c 8 10 0	1.54c	4 0 0
Plain wire, base	1.96c 9 5 0	2.06c	5 7 6
Galvanized wire, base	2.39c 11 5 0	2.41c to 2.43c	6 5 6 to 6 7 6
Wire nails, base	2.54c 12 0 0	2.22c	5 15 0
Tin plate, box 108 lbs.	$ 4.28 0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

		L s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.03	3 7 6(a)	$17.37	260	$14.63	310	$25.65	63
Basic bessemer pig iron	16.03	3 7 6(a)*	12.36	185	13.45	285	28.30 (b)	69.50
Furnace coke	4.04	0 17 0	8.02	120	5.19	110	7.74	19
Billets	26.13	5 10 0	28.72	430	20.77	440	39.29	96.50
Standard rails	1.75c	8 5 0	2.08c	694	2.31c	1,100	2.44c	132
Merchant bars	1.82c	8 12 0	1.68c	560	1.16c	550	2.04c	110
Structural shapes	1.86c	8 15 0	1.65c	550	1.16c	550	1.99c	107.50
Plates, †¼-in. or 5 mm.	1.92c	9 1 3	2.10c	700	1.47c	700	2.35c	127
Sheets, black	2.23c	10 10 0§	2.55c	850‡	1.63c	775‡	2.66c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.76c	13 0 0	4.05c	1,350	3.15c	1,500	6.85c	370
Plain wire	1.96c	9 5 0	3.39c	1,130	2.31c	1,100	3.20c	173
Bands and strips	1.96c	9 7 0	1.95c	650	1.47c	700	2.35c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite †† Close annealed

**Gold pound sterling carries a premium of 69.41 per cent over paper sterling.

Bars

Bar Prices, Page 66

Pittsburgh—The end of a quiet condition in the merchant and alloy bar markets is calculated as close at hand in view of the necessary reappearance of important buyers before long. Many automotive bar purchasers, who bought heavily in January, are now counted on to reappear in the market. Bar producers' backlogs have been further reduced and shipments can be promised more promptly. The 1.80c, Pittsburgh, base on hot-rolled carbon bars, and 2.45c, Pittsburgh, base on hot-rolled alloy bars are both without change.

Cleveland—Steel bar production here has dropped to 36 per cent from a recent rate of 50 per cent, and a February average of 58. This is accounted for largely by the fact automobile manufacturers and forge shops have accumulated inventories. New orders and specifications in general are down moderately, with little support to the market except from automotive and agricultural implement requirements. Railroad buying is in abeyance. Some plow manufacturers report they are experiencing the best volume of business they ever had. Stovemakers are buying a fair amount of angle bars. Prices are unchanged.

Chicago—While little new business for second quarter delivery has been received so far, activity in material for current shipments is well maintained and steady shipments are in prospect for March. Automotive releases continue in good volume, and the tendency in requirements of farm implement manufacturers, particularly tractor builders, is slightly upward. Miscellaneous buying is holding well.

Boston—Commercial steel bars are less active comparatively than forging bars, although there has been some drop in buying of the latter. A Springfield, Mass., district forging shop has been heavily engaged on automotive orders. Alloy bars are moderately active in small lots. Jobbers are ordering at about the rate of their current sales and bolt and nut makers, somewhat encouraged by higher prices, are not generally active.

Philadelphia—Continued good releases from cold drawers feature commercial steel bar trading. In general buying is light, particularly with the railroads showing little interest. The market is 1.80c, Pittsburgh, or 2.09c, Philadelphia.

Yoder Co., Cleveland, has received an order from the Illinois Steel Co., Chicago, for two slitting shears with scrap cutters. The Yoder Co. reports more orders and deliveries thus far in 1935 than all deliveries in 1934.

Plates

Plate Prices, Page 66

Pittsburgh—Barge builders are figuring on 345 tons of plates for two 122 x 32 x 7-foot dump scows for Grand Haven, Mich., shipment, bids on which will be taken March 13 by the Milwaukee engineers. McClintic-Marshall Corp. has been recommended for award on seven steel needle flats for the Pittsburgh engineers on a welded basis, taking 102 tons of plates. Treadwell Engineering Co., Midland, Pa., is fabricating about 100 tons of plates for two oil barges for the Washington engineers. Barges will be shipped knocked down and assembled on the Atlantic coast. Plates are steady at 1.80c, base Pittsburgh.

Cleveland—Tonnage so far this month has not proved satisfactory, although orders are filtering in for a great variety of purposes, and plate mills here continue at 45 per cent. Fabricators report business looking better, and favorable prospects for more work. Some crane builders note improved inquiries and orders, indicating more activity in the durable goods industries. Demand for brewery tanks has shown a tendency to revive, resulting in some good orders for plates. Railroad requirements remain at low ebb.

Chicago—Plate work for oil companies is slow to develop and activity is quieter. Some storage tanks may be required in connection with the gasoline line to be laid in Oklahoma and Nebraska for the Champlin Refining Co. White Star Refining Co. has ordered tanks involving 600 tons to be built at Muskegon, Mich. Several small municipal water tanks, usually involving 50 to 75 tons, are pending in Kentucky. Plate demand from miscellaneous consumers is slow to improve, but involves larger lots than earlier in the quarter. Railroad needs are light, while specifications from railroad equipment builders are spotty.

Boston—Plate buying and inquiry continues in small lots with aggregate volume light and unchanged. Railroads are specifying practically nothing and boiler shop fabricators confine purchases to immediate requirements, generally asking quick delivery. Large pipe and tank requirements are absent, an exception being a 100-ton standpipe for Northboro, Mass.

Philadelphia—With the placing of some navy work and slightly better buying in other directions, plate production has increased slightly. Distribution of several hundred tons of plates by the Sun Shipbuilding Co. for the Erie ferryboat is expected shortly, upon the formal placing of the construction contract. The United States engineer here opened bids last week on a 50-foot steel hull tugboat. The market is 1.90c, Coatesville, Pa., or 1.98½c, Philadelphia.

New York—Steel plates are less active, with fabricated pipe work of chief prominence at the moment. Alco Products Inc., New York, appears low on a fabricated steel pipe alternate for Buffalo involving about 1300 tons. A substantial tonnage of fabricated pipe may be closed for New York shortly. American Dredging Co., Philadelphia, will open bids shortly on rebuilding a dredge at cost of about $500,000.

San Francisco—Some improvement in the plate market is noted. Bookings to date total 11,190 tons, compared with 3400 tons for the same period a year ago. Willamette Iron & Steel Co., Portland, Oreg., took 1000 tons for digesters for the Weyerhaeuser Timber Co., Everett, Wash. Minneapolis-Moline Power Implement Co., Minneapolis, secured 400 tons for interior walls for a school in San Mateo, Calif. Pittsburgh-Des Moines Steel Co., Pittsburgh, booked 100 tons for a 400,000-gallon tank and tower for Deming, N. Mex.

Seattle—Subcontract for 135 tons of liner plates and gates for the Moon Lake dam, Utah, project, is reported awarded to unstated interests by T. E. Connolly, San Francisco, general contractor. No announcement has been received here as to action on 700 tons for dredge pipe for the Fort Peck, Montana, dam, bids submitted two weeks ago.

Contracts Placed

1500 tons, bureau of supplies and accounts, navy department, Washington, delivery to east and west yards, to Central Iron & Steel Co., Harrisburg, Pa., bids Jan. 25, schedule 4078.

1000 tons, digesters for Weyerhaeuser Timber Co., Everett, Wash., to Willamette Iron & Steel Co., Portland, Oreg.

600 tons, tanks, Muskegon, Mich., for White Star Refining Co., Detroit, to unstated fabricator.

400 tons, interior walls for school, San Mateo, Calif., to Minneapolis-Moline Power Implement Co., Minneapolis.

310 tons, pontoon hull, Minneapolis, to Treadwell Construction Co., Midland, Pa.

260 tons, two tanks for state of New York, Poughkeepsie, N. Y., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

180 tons, tanks, E. I. du Pont de Nemours, Belle, W. Va., to Hammond Iron Works, Warren, Pa.

175 tons, two tanks, Gulf Refining Co., Nashville, Tenn., to Graver Tank & Mfg. Corp., East Chicago, Ind.

135 tons, also gates, to unstated interests, Moon Lake dam, Utah; T. E.

Connolly, San Francisco, general contractor.

120 tons, tar separator tank, Elizabethport, N. J., to McClintic-Marshall Corp., Bethlehem, Pa.

100 tons, one 400,000-gallon, tank and tower, Deming, N. Mex., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons, two steel barges, each 100 x 30 x 6 feet, United States engineer, Washington, to Treadwell Construction Co., Midland, Pa.

100 tons, seven needle flats, for Pittsburgh army engineers; four for Pittsburgh army engineers; four for Pittsburgh and three for Cincinnati, to McClintic-Marshall Corp., Bethlehem, Pa., at $16,110 on a welded basis; American Bridge Co., Pittsburgh, low on riveted basis at $18,400.

100 tons or more, 250,000-gallon elevated tank and tower, Idabel, Okla., to Pittsburgh-Des Moines Steel Co., Pittsburgh, $18,990.

Contracts Pending

1300 tons, Hetch Hetchy bay-crossing pipe line, San Francisco; bids opened.

345 tons, two 122 x 32 x 7-foot steel dump scows, for Grand Haven, Mich., shipment; bids March 13 to United States engineers, Milwaukee; noted in STEEL, March 4, as unstated tonnage.

100 tons, corrosion-resisting plates and shapes, bureau of supplies and accounts, navy department, Washington, delivery Washington navy yard, bids March 19, schedule 4476.

100 tons, standpipe, Northboro, Mass.

Unstated, 42-inch outlet welded pipes and outlet works for Agency Valley dam, Vale project, Oreg.; bids March 20, bureau of reclamation, Denver.

Unstated tonnage, two 225-cubic yard capacity steel dump scows for Grand Haven, Mich.; bids March 13 to United States engineer, Milwaukee.

Sheets

Sheet Prices, Page 66

Pittsburgh—Despite the fact cold-rolled sheet demand for future delivery has diminished slightly, producers are booked into April, and in order to accommodate certain rush specifications, the average of operations in the sheet producing industry last week was close to 75 per cent. A leading interest maintained schedules at 80 per cent. Even though new sheet orders are less than recently, they are now on a level with productive capacity, and a continuation of present activity is expected for at least four to six weeks. Miscellaneous buying of sheets has continued unabated, especially in hot-rolled and galvanized grades. Although Pittsburgh base prices on primes are unchanged, a revision in rejects and wasters is proposed for effect April 1, with possible advances of $2 to $8 a ton.

Cleveland—A high rate in sheet mill operations is assured for at least two months. Currently, mills here and in an adjacent lake district are operating at capacity, and expect to continue through March at this level. These mills are booked full for the remainder of this month. One interest has all the tonnage it can take for April, and some specifications in hand for May delivery. Another producer can take additional material for April shipment. Demand from the automobile industry and from manufacturers of household equipment is holding up remarkably well.

Chicago—Some second quarter business is appearing in sheets, buying being prompted largely by desires of consumers to be protected on April requirements. Shipments against old contracts continue heavy and sheet mills appear likely to experience brisk operations at least partway into second quarter. Pressure for delivery of automotive material continues heavy, though some interests have moderate stocks of certain materials on hand. Best activity continues in cold-rolled material, particularly the wider sizes. Few signs of a recession in needs of miscellaneous consumers are appearing.

Boston—While galvanized sheets continue to lag, demand for finishes hold well, notably cold-rolled. Mills apparently are less pressed for delivery, which can now be promised in three weeks on most finishes. Slit cold sheets in some instances are cutting into cold-rolled strip volume.

New York—Sheet sellers with continuous mills are sold up for this quarter on hot-rolled, as well as cold-rolled products. Hand mills are in better position to make early shipments. General specifications are being sustained at the rate of the past several weeks.

Philadelphia—Except for certain grades of cold finished, sheet demand is far from brisk. While recently some improvement was noted in galvanized sheets, volume remains restricted, with nothing like normal requirements being specified. Prices are steady.

Buffalo—District sheet mills continue operating at 70 to 75 per cent, and have substantial unfilled tonnage. The outlook for the remaining weeks of this month is good.

Cincinnati—Miscellaneous demand for sheets, especially for household appliances, is more active. Mill output will be maintained near capacity through March.

St. Louis—Sheet demand is active and highly diversified, although interest centers in the lighter grades. Jobber buying of sheets exceeds expectations in view of heavy acquisitions by these interests in January and the first half of February.

Birmingham, Ala.—Demand for sheets continues to lead the steel markets in the South.

Transportation

Track Material Prices, Page 67

New York Central is placing 20,000 tons of rails and 9000 tons of accessories, distribution to be made shortly. Atlantic Coast Line has awarded 5000 tons of rails to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Domestic freight car awards in February were 806, compared with 19,725 in February last year. Comparisons follow:

	1935	1934	1933	1932
Jan.	24	152	3	159
Feb.	806	19,725	0	35
2 Mo.	830	19,877	3	194
March		30	5	105
April		800	50	0
May		717	8	60
June		1,835	500	0
July		19	306	25
Aug.		105	202	5
Sept.		7	23	1,298
Oct.		75	514	0
Nov.		254	533	2
Dec.		110	316	50
Total		23,829	2,460	1,739

Bangor & Aroostook has divided 800 tons of tie plates and fastenings among four mills, following its recent purchase of 1000 tons of rails. Some eastern roads which early in the year indicated probable purchase of considerable tonnage of rails are understood to have deferred buying until fall.

Chicago & North Western has placed 54 air conditioning units with Waukesha Motor Co., Waukesha, Wis. Union Pacific has awarded axle-driven generators and motor for driving air conditioning equipment for five cars with Fairbanks, Morse & Co., Chicago. The air conditioning equipment will be furnished by York Ice Machinery Corp., York, Pa.

New York Central has applied for a loan from the government of $1,500,000 with which to buy 20,000 tons of rails at $727,500 and 9510 tons of other track material at $478,500, the remainder for labor. A loan of $11,282,736 to the Erie for a ferryboat and 55 milk cars has been approved by the interstate commerce commission. Waco, Beaumont & Sabine has received the commission's approval of a loan of $260,000 for widening of bridges and trestles and purchase of second-hand locomotives.

Car Orders Placed

Merrimac Chemical Co., Boston, two tank cars, one 40 tons and one 70 tons capacity, to American Car & Foundry Co., New York.

Rail Orders Placed

Atlantic Coast Line, 5000 tons, to Tennessee Coal, Iron & Railroad Co., Bir-

mingham, Ala.
Gulf, Mobile & Northern, 3218 tons rails and 700 tons accessories, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Locomotives Pending

United States navy, bureau of supplies and accounts, Washington, two 30-ton diesel-electric switch engines, bids opened March 8.

Rail Orders Pending

Kansas City Southern, 2000 tons; bids asked.
Missouri Pacific, 10,000 tons; bids asked.
Erie, 20,000 tons; purchase being considered.

Buses Placed

Conestoga Transportation Co., Lancaster, Pa., three 29-passenger metropolitan type, to American Car & Foundry Motors Co., New York.
St. Louis Public Service Co., St. Louis, two 30-passenger metropolitan type, to American Car & Foundry Motors Co., New York.
Triple Cities Traction Corp., Binghamton, N. Y., eight 29-passenger metropolitan type, to American Car & Foundry Motors Co., New York.

Cold Finished

Cold Finished Prices, Page 67

Pittsburgh—March sales of cold-finished steel is at about the February rate. Forward buying by automotive interests has not been overly active and jobbers are not inclined to build up stocks. Miscellaneous manufacturers are as prominent proportionately as any other class of buyers. All important producers are adhering to the 2.10c, Pittsburgh base, for carbon cold-drawn bars, and 2.95c, Pittsburgh, for alloy.

Strip Steel

Strip Prices, Page 67

Pittsburgh — Few second-quarter strip steel contracts have been reported but producers' backlogs are still so imposing that deliveries cannot be promised on new business much before the middle of April. This applies in both the hot-rolled and cold-rolled strip markets, where prices are being extended for second quarter on the basis of 1.85c, Pittsburgh, on hot-rolled strip, and 2.60c, on cold-rolled strip steel. Optimistic reports continue to be heard from automotive buyers and miscellaneous consumers are also prominent in strip steel buying with a noticeable share being taken by stainless strip users.

Cleveland—While shipments for automobile manufacturers are sustained at their recent levels, new specifications are slower in developing. The Cleveland strip mill continues operating close to capacity on previous orders and has releases sufficient to sustain this rate through this month.

Chicago—While there is little improvement in strip demand generally, activity in shipments against contracts is steady and moderate tonnages are being added to books for second quarter delivery. Consumption appears to have leveled off, and there are no indications of change.

Boston—Cold strip demand has declined slightly with most sellers, due to lessened activity of automotive users. Until a week ago hot strip had been the most active but this lead has been lost.

New York—Narrow strip has been moving better the past three or four weeks than earlier in the year; however, volume is still disappointing to most sellers. Prices are unchanged.

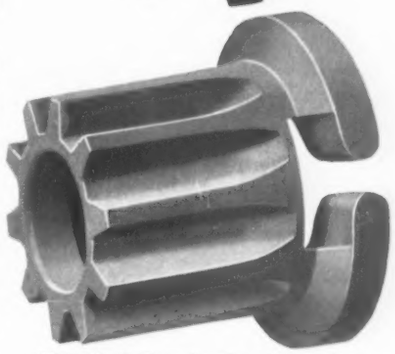
Philadelphia — Narrow strip tonnage remains light, particularly cold-finished strip. In fact, there has been little trading in this material this year. Prices are 1.85c, Pittsburgh, or 2.14c, Philadelphia for hot strip and 2.60c, Pittsburgh, or 2.89c, Philadelphia, for cold strip.

Shock . . . stress . . . wear . . . **the triple threat that is ever-present in the constant clashing of gears.**

Resisting these severe hazards in the "daily grind" of service, demands a *gear steel* of toughness and temper, plus uniformity of grain and texture—for a gear is only as strong *as its weakest tooth.*

In many difficult applications, gears cut from B & L Cold Drawn Steel have shown unusual ability to stand hard punishment. They can often be substituted for cast or forged gears with advantages of greater economy and longer life.

Gear steel for specific uses is developed from B & L special alloy stock to insure not only strength but also good machining qualities—with minimum distortion after heat treatment, so that you can secure the precision necessary for quiet-running gears.



This Clash Gear for the pinion of a starting mechanism is cut from B & L Cold Drawn Steel. Its service life is more than satisfactory.

If you have an involved problem in gear manufacture, why not avail yourself of the experience and cooperation which B & L engineers are always ready to give you?

COLD DRAWN BARS AND SHAFTING ● FREE-CUTTING SCREW STOCK ● EXTRA WIDE FLATS ● SPECIAL SECTIONS ● ALLOY STEELS

BLISS & LAUGHLIN, INC.

HARVEY, ILL. *Sales Offices in all Principal Cities* **BUFFALO, N.Y.**

Shapes

Structural Shape Prices, Page 66

New York—Closing on 33,000 tons of structurals, steel castings and miscellaneous needs for suspended spans and approaches for the Triboro bridge, March 14, features activity. The size of this project will naturally limit the number of bidders to the larger fabricators. State and railroad bridges active require approximately 1500 tons with close to 2200 tons bid for schools.

Pittsburgh—Releases on steel piling orders placed recently have been increasing, and rolling operations among Pittsburgh producers have expanded. Bids have been postponed for the second time on 9000 tons for the Library of Congress addition, Washington, until March 22. Plain structural shapes hold at 1.80c, Pittsburgh.

Cleveland—A light volume of structural shapes is being placed, including during the week 240 tons for two Nickel Plate railroad bridges at Cicero and Muncie, Ind.; and 225 tons for buildings for the West Virginia Chlorine Products Co., Charleston, W. Va., through a Cleveland contractor. Approximately 1000 tons still are pending for two projects here on which bids were taken recently. While plain material prices are firm, fabricated are irregular.

Chicago—Structural inquiries are substantially heavier, though awards continue light. In view of the increasing volume of pending work, an upturn in orders and in shape rollings is in prospect for second quarter. Bids close April 3 on about 4000 tons of structural material for the Fort Peck, Mont., dam spillway. A postoffice at San Antonio, Tex., involves 3500 tons, while 2000 tons will be required for work of the Minneapolis-St. Paul sanitary district. The largest of new bridge inquiries is 1175 tons, Tazewell, Tenn.

Boston—Structural contracts placed are light, but more work is being figured. Schools account for a good part of the improved outlook, especially in Rhode Island and Massachusetts. Worcester, Mass., will be ready for bids shortly on a new central library, taking a fair volume. Small-lot buying has improved, but New England structural shops have little on their books for sustained operations.

Philadelphia—The market is dull. Only one fair size award is noted, and but two new inquiries of even moderate proportions. Fabricators are hopeful of an improvement before the end of this month. Shapes are 1.90c, Bethlehem, Pa., or 2.00½c, Philadelphia.

San Francisco—Few structural awards were made during the week. The outstanding lettings went to the Consolidated Steel Corp., for 1070 tons for tunnel ribs, metropolitan water district, Los Angeles. Bids have been taken on 200 tons for two locomotive cranes for the Mare Island, Calif., navy yard.

Seattle—The week developed no important projects, although there is considerable business in lots of less than 100 tons. New work is in sight for the near future but is moving slowly. Lake Side Bridge & Steel Co., Milwaukee, is low at $23,281 for construction of a 75-ton gantry crane and a 15-ton auxiliary hoist for the storage yard, Coulee, Wash., dam project, tonnage unstated.

Shape Contracts Placed

1070 tons, tunnel ribs, specification M-2038, metropolitan water district, Los Angeles, to Consolidated Steel Corp., Los Angeles.

750 tons, armory, Minneapolis, to Minneapolis-Moline Power Implement Co., Minneapolis.

665 tons, building for Ford Motor Co., Dearborn, Mich., to R. C. Mahon Co., Detroit.

600 tons, work for United States engineer corps, Myrtle Beach, S. C., to American Bridge Co., Pittsburgh; through MacDougall Construction Co., Atlanta.

579 tons, state highway bridge NRH 244-B, Jefferson county, and state bridge NRM 314-A, Beaver county, Oklahoma, to Capital Iron & Steel Co., Oklahoma City, Okla.

560 tons, two state highway bridges, Turpin and Atwood, Okla.; to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

400 tons, bridge, Cloud county, Kansas, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

330 tons, state highway bridge, Westport, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

320 tons, postoffice and court house, Abilene, Tex., to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

300 tons, plant building, Nehring Electrical Works, Dekalb, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

280 tons, addition, building 83, General Aniline Works Inc., Rensselaer, N. Y., to James McKinney & Co., Troy, N. Y.

275 tons, Fine Arts building, University of Wyoming, Laramie, Wyo., to Minneapolis-Moline Power Implement Co., Minneapolis.

270 tons, bridge, Mifflin county, Pennsylvania, to McClintic-Marshall Corp., Bethlehem, Pa., which also booked 75 tons for a passenger substation in Camden, N. J.

255 tons, addition, Monolith-Portland Cement Co., building, Monolith, Calif., to McClintic-Marshall Corp., Bethlehem, Pa.

250 tons, building, Hackensack, N. J., for In-Tag Co., to Harris Structural Steel Co., New York.

240 tons, two bridges for Nickel Plate railroad, Cleveland, at Cicero and Muncie, Ind., to Fort Pitt Bridge Works, Pittsburgh.

225 tons, building for West Virginia Chlorine Products Co., Charlestown, W. Va., to Pittsburgh Bridge & Iron Works, Pittsburgh; through H. K. Ferguson Co., Cleveland, general contractor.

220 tons, two highway bridges, Missouri, to American Bridge Co., Pittsburgh.

220 tons, state highway bridge, Foard-Hardeman counties, Texas, to North Texas Iron & Steel Co., Fort Worth, Tex.

215 tons, state highway project 27-2-NRH 358-A, Morton county, Kansas, to Ben Sibbitt Co., Wichita, Kan.

210 tons, 2-story building, International Printing Ink., Co., Hackensack, N. J., to Harris Structural Steel Co., New York.

200 tons, bridge for department of agriculture, Kooskia, Idaho, to McClintic-Marshall Corp., Bethlehem, Pa.

190 tons, grandstand, dog track, Cambridge, Mass., to New England Structural Steel Co., Everett, Mass.

185 tons, state highway bridge, Wise county, Virginia, to Virginia Bridge & Iron Co., Roanoke, Va.

165 tons, David A. Howe memorial library, Wellsville, N. Y., to R. S. McMannus Structural Steel Co., Buffalo; L. C. Whitford, Wellsville, general contractor.

143 tons, state bridge near Granby, Grand county, Colorado, to unnamed interest.

125 tons, St. Joseph's church, Roselle, N. J., to H. R. Goeller Co., Newark, N. J.

100 tons, two postoffices, Lakewood, O., and Station H, Cleveland, to Fort Pitt Bridge Works, Pittsburgh.

Shape Awards Compared

	Tons
Week ended March 9	**9,242**
Week ended March 2	**11,321**
Week ended Feb. 23	**9,968**
This week in 1934	**13,725**
Weekly average, 1934	**16,281**
Weekly average, 1935	**12,866**
Weekly average, February	**13,702**
Total to date, 1934	**185,044**
Total to date, 1935	**128,660**

Shape Contracts Pending

4000 tons, dam spillway, Fort Peck, Mont.; bids to United States engineer, Kansas City, Mo., April 3.

3500 tons, postoffice, San Antonio, Tex.

2000 tons, structural piles, Minneapolis-St. Paul sanitary district; general contract to Barnett & Record Co., St. Paul.

1175 tons, bridge, Tazewell, Tenn.

1100 tons, public school No. 43, Manhattan, New York.

1020 tons, three state highway bridges, Georgia.

600 tons, Lyons bridge, Baraboo, Wis.; bids about April 15.

500 tons, New York Central grade elimination, Utica, N. Y.; bids March 18.

360 tons, bridge for Southern Pacific Co., San Francisco.

350 tons, penstock trashrock structure, Norris power plant, near Coal Creek, Tenn.; bids March 11 to Tennessee valley authority, Knoxville, Tenn.

310 tons, state highway bridge, King's Bridge Station, N. Y.

250 tons, parcel post building, Detroit.

250 tons, school, Northampton, Mass.

245 tons, hospital, Warm Springs, Mont.; bids opened.

225 tons, state highway bridge, Niagara county, New York, McLane Construction Corp., Buffalo, low, $55,727, bids March 5.

250, tons, addition to public school Brooklyn, N. Y.

200 tons, two 20-ton locomotive cranes, specification 7857, Mare Island, Calif., navy yard; Orton Crane & Shovel Co., Chicago, low.

200 tons, housing project, Atlanta, Ga.

200 tons, high school, St. Louis.

175 tons, state highway bridge, Chippewa Falls, Wis.; bids March 12.

175 tons, plant addition, Armstrong Cork Co., Lancaster, Pa.; bids asked.

165 tons, state highway bridge, Steuben county, New York, John Petrossi & Sons Inc., Rochester, low.

155 tons, highway, Columbia, Conn., and bridges, Killingworth and Madison, Conn.; Arboria Construction Co., Wilson, Conn., $119,373.07, low on highway; D. V. Frione Co., New Haven, $42,720.27, low on bridges.

150 tons, school, Auburn, Mass., bids in.

140 tons, addition to Moses Taylor hospital, Scranton, Pa.; bids asked.

115 tons, postoffice, Hagerstown, Md.; Spence Bros., Saginaw, Mich., general contractors; Kalman Steel Corp., Bethlehem, Pa., awarded 64 tons of reinforcing bars.

100 tons, Ninth street Baptist church, Cincinnati; also 40 tons of concrete bars.

100 tons, Stephen Foster memorial, University of Pittsburgh, Pittsburgh; W. F. Trimble & Sons Co., Pittsburgh, general contractor.

Unstated, 75-ton gantry crane and 15-ton auxiliary hoist, for Coulee, Wash., dam project; Lake Side Bridge & Steel Co., Milwaukee, low.

Reinforcing

Reinforcing Bar Prices, Page 67

Pittsburgh—Additional tonnage will be required soon for the Muskingum, Ohio, watershed conservancy district, bids to be asked on at least 11 more dam projects. Contracts have already been awarded for five projects requiring several thousand tons of rail steel and new billet bars. Jobbers continue to quote 2.05c, Pittsburgh, in carload lots, for new billet bars, and 1.95c, Pittsburgh, on the same basis, for rail steel quality.

Cleveland—The market is more active, including inquiries for 350 tons for an office building for Telling, Belle Vernon Co., Cleveland, 110 tons for a Wheeling & Lake Erie railroad dock at Huron, O., which also will take 600 tons of shapes; 100 tons or more for a Wooster college building, Wooster, O. While county commissioners here and in adjoining counties are taking bids on several bridge and road repair jobs, state work of this description is developing slowly.

Chicago—Bids will be taken April 3 at Kansas City on 11,000 tons of bars for the dam spillway at Fort Peck, Mont. Several other large inquiries are pending, including 1000 tons for a Detroit parcel post building, and 1600 tons for the Minneapolis-St. Paul sanitary district. Heavier rollings of concrete bars are in prospect for the coming quarter, in view of the sizable tonnage involved in various projects which are scheduled to be placed in the near future. Placing of orders for road work generally is deferred. Private construction, while only moderately active, is in better volume than a year ago.

Boston—Reinforcing bar requirements are up materially, several hundred tons pending for highways and bridges in New England, 600 tons for a school at Providence, R. I., and 450 tons for the Boston parcel post build-

Concrete Awards Compared

	Tons
Week ended March 9	1,726
Week ended March 2	5,215
Week ended Feb. 23	13,776
This week in 1934	5,760
Weekly average, 1934	4,084
Weekly average, 1935	4,938
Weekly average, February	5,506
Total to date, 1934	44,465
Total to date, 1935	49,838

•

SHEARED STEEL PLATES

Carbon and Alloy Grades

ANY QUALITY
ANY ANALYSIS

•

A. W. ROLLED STEEL FLOOR PLATES

•

ALAN WOOD STEEL CO.

CONSHOHOCKEN, PA.

ALAN WOOD STEEL CO. ESTABLISHED "A.W." TRADE MARK 1826 CONSHOHOCKEN, PA.

•

BRANCH OFFICES: *Boston, New York, Philadelphia, Memphis, Seattle, San Francisco, Los Angeles*

109 YEARS' STEEL MAKING EXPERIENCE

ing, the latter contract being tentatively placed.

New York—Reinforcing steel awards for the week total several hundred tons, including a slight gain in small orders. Fresh inquiry has improved slightly, however, with far less highway and bridge requirements out than at this time last year. General contracts were awarded last week on highway and bridge projects in Connecticut taking 165 tons.

Philadelphia—Delay continues to be experienced in the placing of the three or four fair size reinforcing bar tonnages pending here. Business is restricted almost entirely to small lots. Billet steel bars, cut lengths, are 2.05c, Pittsburgh, or 2.34c, Philadelphia.

San Francisco—A fair tonnage was placed during the week, and awards so far this year aggregate 26,211 tons, compared with 14,145 tons in the corresponding period in 1934. The largest letting went to Soule Steel Co., Los Angeles, requiring 321 tons for a high school in Santa Ana, Calif. Close to 1500 tons of wire rods and wire mesh will be required for that portion of the Green River pipe line, Tacoma, Wash., awarded to the American Concrete Pipe Co. Public work continues to comprise more than 80 per cent of the business offered.

Seattle—While the week's awards were nearly 1000 tons, new business is slow in developing and local mills have no important projects up for figures. There is a fair run of small jobs involving less than 100 tons each.

LOW-COST HANDLING
WITH LINK-BELT CONVEYORS

FREE-turning, accurately made idlers assure the belt conveyor a good roadbed for economical operation . . . minimum friction loads . . . long belt life . . . and the lowest maintenance cost. Link-Belt makes a full line of anti-friction, pressure-lubricated idlers, as well as all necessary machinery and driving parts for the complete conveyor.

Submit your conveyor and power transmission problems to Link-Belt. Send today for catalog.

LINK-BELT COMPANY
CHICAGO - PHILADELPHIA - INDIANAPOLIS
ATLANTA - SAN FRANCISCO - TORONTO
Offices in Principal Cities

Link-Belt Anti-Friction Type 70 Belt Conveyor Idler

Link-Belt Anti-Friction Type 57 Self-Aligning Idler, for automatically training the belt, thereby materially lengthening its life.

Link-Belt Anti-Friction Type 40 Belt Conveyor Idler.

5158-C

Reinforcing Steel Awards

435 tons, Moon Lake, Utah, dam project, to unstated interests; T. E. Connolly, San Francisco, general contractor.

350 tons, Ebey Slough, Wash., state span, to Pacific Coast Steel Corp., Seattle; West Coast Construction Co., Seattle, general contractor.

321 tons, high school, Santa Ana, Calif., to Soule Steel Co., Los Angeles.

250 tons, apartment, Bronx, New York, to Kalman Steel Corp., Bethlehem, Pa.; through Industrial Engineering Co.

165 tons, highway, Cheshire, Mass., to Northern Steel Co., Boston.

135 tons, bars and shapes, bridge, Oak Bluffs, Mass., to Bancroft & Martin Rolling Mills, South Portland, Me., and New England Structural Steel Co., Everett, Mass; item revised from last week.

100 tons, bureau of roads bridge, Rainier national park, Washington, to unstated interests; Joplin & Eldon, Portland, general contractor.

Reinforcing Steel Pending

11,000 tons, dam spillway, Fort Peck, Mont.; bids to United States engineer, Kansas City, Mo., April 3.

1600 tons, Minneapolis-St. Paul sanitary district; general contract awarded to Barnett & Record Co., St. Paul.

1000 tons, parcel post building, Detroit.

645 tons, state highway projects, Louisiana, bids March 6 and 13.

350 tons, office building, for Telling, Belle Vernon Co., Cleveland; bids being taken.

270 tons, state highway project, mainly for bridge over Ocmulgee river, Telfair-Coffee counties, Georgia; bids March 8.

120 tons, state highways, North Carolina; bids in March 5.

120 tons, repairs to Harvard-Denison avenue bridge, Cuyahoga county, Ohio, Cleveland.

119 tons, seven state bridges, Yuba county, California; bids opened.

110 tons, dock at Huron, O., for Wheeling & Lake Erie railroad, Cleveland; project also will require 600 tons of shapes.

105 tons, Howe memorial library, Wellsville, N. Y., to a Buffalo interest, through L. C. Whitford, Wellsville.

100 tons, or more, building, Wooster college, Wooster, O.

Quicksilver

New York—Fair demand for quicksilver is reported by some sellers. Prices are unchanged, lots of 100 flasks $72.50, a virgin flask of 76 pounds; small lots of 15 to 24 flasks, inclusive, $74 a flask, and lots of less than five flasks $75.

Pipe

Pipe Prices, Page 67

Pittsburgh—Two of the largest pipeline projects in more than a year were awarded last week. Champlin Refining Co., Enid, Okla., awarded tonnage for a 250-mile line from Enid, Okla., to Superior, Nebr., taking about 10,000 tons of 6-inch seamless line pipe, to Youngstown Sheet & Tube Co., Youngstown, O., for immediate shipment. General Petroleum Corp., Los Angeles, subsidiary of Socony-Vacuum Co., New York, placed orders for 9000 tons of 10¾-inch seamless pipe among three producers. National Tube Co., Pittsburgh, was awarded 4500 tons; Youngstown Sheet & Tube Co., Youngstown, O., 3600 tons, and Spang Chalfant & Co. Inc., Pittsburgh, 900 tons. Production and shipments are starting at once on both of these line pipe orders as the material is for immediate installation. Bids on 930 feet of 17-inch pipe in 20-foot sections will be taken March 15 at Cincinnati, by the Cincinnati army engineers.

Cleveland—Steel pipe for miscellaneous maintenance work is in fairly good demand. Several nearby municipalities have placed small lots of cast pipe. Cleveland has a project for 13 miles of 12-inch steel or cast pipe to connect its eastern and southerly sewage disposal plants, which may be up for figures shortly. It has not yet signed the general contract for the blower building at the easterly plant, for which 200 tons of 60-inch cast pipe, and 600 tons of shapes and reinforcing bars are required.

Chicago—United States Pipe & Foundry Co. and Lynchburg Foundry Co. are low bidders on 3258 tons of large diameter cast pipe and 388 tons of fittings for Chicago. A new inquiry for this city calls for 2100 tons of 6, 8, 12 and 16-inch sizes. Activity elsewhere the past week was quiet.

New York—Buffalo has bids on 2700 tons 36-inch cast pipe, with alternates on steel, the latter to be copper-molybdenum steel or ingot iron plates, ½-inch thick and electrically welded. Most of the 4000 tons of cast pipe for New York city is still to be awarded.

Boston—Merchant steel pipe inquiry is heavier, largely for miscellaneous repairs and replacements. Pending heating contracts require more one or two car-lot shipments, but yet unplaced. Cast pipe activity has been retarded by delays in completing plans, although several projects are now about ready for bids.

San Francisco—General Petroleum Corp., Los Angeles, has placed 9000 tons of 10¾-inch seamless steel pipe, the heaviest line pipe tonnage awarded in many months. Awards of cast iron pipe were the second largest for any week of the year and aggregated 1181 tons, bringing the total for the year to 4822 tons, compared with 2306 tons for the same period last year. Pacific States Cast Iron Pipe Co. took over 1100 tons for four cities in Utah. The Hetch Hetchy bay-crossing pipe line, up for figures March 6, will require close to 5500 tons of cast pipe.

Philadelphia—While specifications for tubing from oil fields in the Southwest are reported declining, a tube mill in this district is operating at 70 to 80 per cent.

Seattle—Business continues slow in this area although heavy potential demand is expected to develop shortly. Milton, Oreg., plans a replacement project with about 12,000 feet of 4 to 12-inch steel pipe, welded joints. Bids will be asked soon.

Birmingham, Ala.—New awards of pipe continue to be received by producers here. Orders are in small lots, but sufficient in the aggregate to

RACKETEERS OF WASTE

GENUINE OPEN HEARTH IRON
GOHI
PURE IRON - COPPER ALLOY

YOU always lose . .

when you gamble with these three

Sheet metal satisfaction begins with YOUR sheet metal decision. You always lose when you take chances with Wear, Weather and Corrosion, these three arch enemies of sheet metal, whose toll mounts into millions annually.

When you use GOHI Pure Iron-Copper Alloy you know that you are getting the utmost value for your money, because GOHI is the longest-lasting, low-cost ferrous metal you can buy.

For every purpose GOHI is the logical choice of exacting sheet metal, whether the job requires a single sheet or several hundred tons. Get all the facts about GOHI. Samples and complete information on request.

GOHI

GOHI Pure Iron-Copper Alloy is available in all sizes and gauges. Produced exclusively by The Newport Rolling Mill Co., Newport, Ky.

PRONOUNCED "GO-HIGH"

SHEET METAL

THE NEWPORT ROLLING MILL COMPANY . . . NEWPORT, KENTUCKY

maintain operations around 25 per cent. Spring seasonal requirements are expected to increase this rate slightly.

Austin, Tex.—Satisfactory progress is being made with preliminary plans for two parallel 24-inch natural gas pipelines from the Panhandle district of northwest Texas to St. Louis and Detroit. Financing, with cost estimated at$60,000,000, is dependent upon a loan from PWA, and the project may be included in the proposed work relief bill. It would require 415,000 tons of steel and would afford work equal to 47,600,000 man-hours of labor, according to Governor Allred of Texas, reported originator of the idea. The lines would tap adequate reserves in Texas and supply 400,000,000 cubic feet of gas per day to St. Louis and Detroit.

Cast Pipe Placed

1700 tons, 16-inch, Blackwell, Okla., to Sherman Machine & Iron Works, Oklahoma City.

466 tons, 4 and 6-inch, class 150, Kanab, Utah., to Pacific States Cast Iron Pipe Co., Provo, Utah.

390 tons, 30-inch, Washington, to United States Pipe & Foundry Co., Burlington, N. J.

304 tons, 2 to 8-inch, class 150, Levan, Utah, to Pacific States Cast Iron Pipe Co., Provo, Utah.

268 tons, 2 to 8-inch, class 150, Monroe, Utah., to Pacific States Cast Iron Pipe Co., Provo, Utah.

123 tons, 2 and 4-inch, class 150, Koosharem, Utah, to Pacific States Cast Iron Pipe Co., Provo, Utah.

Steel Pipe Placed

10,000 tons, approximately, 6-inch seamless, 250-mile line from Enid, Okla., to Superior, Nebr., for Champlin Refining Co., Enid, to Youngstown Sheet & Tube Co., Youngstown, O.

9000 tons, 10¾-inch seamless, 88-mile line in California, for General Petroleum Corp., Los Angeles, allocated as follows: 4500 tons to National Tube Co., Pittsburgh, through Columbia Steel Co.; 3600 tons to Youngstown Sheet & Tube Co., Youngstown, O.;; 900 tons to Spang, Chalfant & Co. Inc., Pittsburgh.

Cast Pipe Pending

5500 tons, Hetch Hetchy bay-crossing pipe line, San Francisco; bids opened.

3258 tons, 20, 24, 36 and 54-inch, Chicago; United States Pipe & Foundry Co., Burington, N. J., and Lynchburg Foundry Co., Lynchburg, Va., low; former also low on 203 tons 3 to 24-inch fittings; latter low on 185 tons 30 to 54-inch fittings.

2100 tons, 6, 8, 12 and 16-inch, Chicago; bids to commissioner of public works, March 15.

133 tons, 4, 6 and 8-inch, Ekalaka, Mont., improvement; general contract to Boespflug & Manning, Miles City, Mont.

Steel Pipe Pending

Unstated tonnage, 890 feet, 2-inch pipe rail for sewer system unit, Springfield, Ill.; bids March 12.

Wire

Wire Prices, Page 67

Pittsburgh—Further contraction has occurred in demand for manufacturing wire, placing March definitely beneath the comparable February showing. In addition merchant wire buying is not active. Pittsburgh producers continue to quote carload prices of 2.30c, Pittsburgh, on plain manufacturing wire; 2.90c on spring wire; $2.60 per keg on nails, and $63 per base column on fencing.

Cleveland—Production and shipments are sustained at the February level, mainly by demand from automobile and agricultural requirements, with wire mills here operating at 60 per cent. Demand for wire for the manufacture of industrial screens has increased moderately.

Chicago—Wire demand is steady, but the recent upward trend has been halted. Orders for wire products have shown little improvement, but are expected to be heavier with the approach of spring. Shipments of manufacturers' wire are about even and are expected to remain steady during the remainder of March. Little business has been booked for second quarter, most consumers preferring to await a better determination of future requirements before ordering ahead. Automotive shipments show no improvement but are well maintained.

Boston—Incoming volume of wire orders has eased somewhat in most departments, including spring manufacturers and most specialties.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 67

Bolts and nuts are now being quoted 70-10-5 off list, on spot business, with the advance of 5 points to become effective on contracts April 1. The change did not affect large rivets, which continue 2.90c, Pittsburgh and Cleveland, 3.00c, Chicago, nor small rivets at 70-5 off.

At Cleveland shipping releases have been received from some of the leading automobile manufacturers up to May 1. As leading automobile interests contracted for their requirements for the first six months of this year they will not be affected by the 5-point advance in the price of nuts and bolts until July 1. Agricultural implement and tool makers continue ordering fairly good quantities; stove

ARC WELDING
ELECTRODES
STAINLESS and HEAT RESISTING

If you weld stainless alloys buy from the oldest company producing Alloy Electrodes exclusively and serving the world's leading steel producers and users. All popular analyses of chrome and chrome-nickel electrodes carried in stock.

MAURATH, INC.
7311 Union Ave., Cleveland, Ohio

manufacturers also figure in sales. Railroad demand is quiet.

A better tone is noted in the bolt and nut market at Chicago and railroad demand has improved moderately. Builders of agricultural implements are relatively large users. Specifications against first quarter contracts are expected to be heavy due to the recent price advance.

Tin Plate

Tin Plate Prices, Page 66

Pittsburgh—Though steady at about 80 per cent, tin plate production schedules last week showed definite signs of early increase. The leading interest with considerable backlog to produce operated slightly above the average for the industry. Tin plate, at $5.25 per base box, and tin mill sizes of black sheets at 2.75c, Pittsburgh, are firm.

New York—Tin plate specifications are well sustained. In the opinion of some observers the two principal can companies consumed more metal since the first of the year than in any corresponding period in their history.

Semifinished

Semifinished Prices, Page 67

Tin plate and sheet rollers still are making commitments for semifinished steel, but wire rod, billet and skelp shipments from the Pittsburgh district are tapering. Award of two large seamless pipe lines the past week, involving almost 19,000 tons of finished pipe, will result in a heavier demand for tube rounds. Producers continue to quote $27, Pittsburgh, for billets; $28 for sheet bars, and $32 for forging quality billets. Skelp is 1.70c, and tube rounds are based on 1.80c, Pittsburgh.

Metallurgical Coke

Coke Prices, Page 67

Conditions in the coke market are steady, with metallurgical coke users taking regular shipments and foundry consumers increasing requirements in some districts. Prices of Connellsville, Pa., coke are unchanged and by-product producers in various district have extended prices for second quarter.

Receipt of small shipments of German coke at Boston and New York have forced sellers of domestic coke to reduce prices 50 to 60 cents per ton but have had no other effect on the situation.

At Chicago foundries are increasing their purchases steadily, buying being for immediate needs rather than for stock. Cincinnati dealers find foundry coke demand slightly under that for February. A steady demand is experienced in the St. Louis district for by-product foundry coke and consumer stocks are low.

Pig Iron

Pig Iron Prices, Page 68

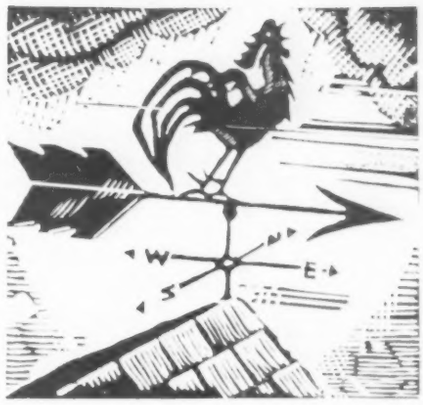
Pittsburgh—Steel mill roll manufacturers, buying charcoal pig iron, have been a fairly bright spot in the local merchant iron market, and basic shipments have picked up to a down-river nonintegrated steel producer, which has stepped up operations. Pittsburgh district furnaces continue to quote on the basis of $18 for basic iron, $18.50 for foundry grades and $19 for bessemer.

Cleveland—Shipments continue to increase moderately, the daily average so far in March exceeding that in the corresponding period in February. Automobile and agricultural implement requirements account for this gain, as in other consumer classifications little change is noted from the rate last month. All users are placing forward business more conservatively, anticipating larger requirements but unwilling to make full commitments at this time. Since March 1 a lake merchant furnace interest has booked 15,000 tons, including spot orders and second quarter contracts. Prices are steady.

Chicago—Second quarter pig iron bookings so far are in encouraging volume and compare favorably with the corresponding period three months ago. Shipments against old contracts are well maintained and indications are that March deliveries will be heavier than those of February, making the eighth consecutive month of rising shipments. Some recession in schedules of automotive foundries is in prospect during late March or early April, but farm implement manufacturers and heating equipment suppliers have a favorable outlook. Pig iron continues $18.50, furnace, for No. 2 foundry and malleable.

Boston—Small-lot buying by some foundries in Connecticut has improved slightly. Larger consumers of pig iron, however, are not contracting. Imports of pig iron in the Boston customs district, No. 4, last month totaled 1739 tons, 1298 tons from the Netherlands and 441 tons from India.

New York—The restricted foundry melt in this district appears to be about holding its own and with virtually no future buying, this situa-



WHICH WAY does the wind blow ?

We, like other users of machinery, have found that the use of welded rolled steel in construction of machinery provides greater strength, reduced weight and lower costs. Naturally we specify such construction, wherever practical, in the equipment we buy. This explains why the trend of a few years ago toward the use of welded rolled steel has now developed into established practice with many progressive manufacturers.

Among the hundreds of Carnegie rolled sections manufacturers of machinery will find many which are particularly applicable to their needs. A copy of the Carnegie Shape Book should be on the desk of every designer of machinery and equipment. Do you have a copy?

CARNEGIE STEEL COMPANY
PITTSBURGH • PA.

Rolled Structural Sections also produced by
ILLINOIS STEEL COMPANY... *Chicago*
COLUMBIA STEEL COMPANY... *San Francisco*
TENNESSEE COAL, IRON & RAILROAD CO. *Birmingham, Alabama*

318

United States Steel Corporation Subsidiaries

tion is directly reflected in pig iron. Orders are restricted to small lots and consumers are not inclined to be much disturbed by possibility of a strike in the bituminous coal fields April 1. They believe most furnaces not only have good stocks of coke on hand, but good stocks of iron and that, unless such labor trouble became prolonged, it would have no early effect.

Philadelphia—Some improvement in tonnage has been registered since the first of the month, pig iron shipments appear at least to have been maintained and considering volume since the first of the year, there has been substantial improvement. An eastern blast furnace is expected to blow in around the end of this month.

Buffalo—Demand for pig iron has been slow so far this month and shipments are beginning to react from the improved rate of February. Shipments last month showed material gain over January. A second merchant furnace, scheduled to go into production here in April, probably will be ready toward the end of this month.

Cincinnati—Early March shipments of pig iron were maintained at the February level in this district, with possibility of an upward trend to ship out all contract tonnage. The jobbing foundry melt remains spotty.

St. Louis—New buying of pig iron continues in small lots for prompt shipment, with total volume showing some recession from recent weeks. Shipments, however, continue at a high rate, with specifications indicating that March will exceed the preceding month in aggregate tonnage delivered to district melters. Sellers report the first two months of the year the best experienced for any like period since 1930. Spotty conditions are reported by jobbing foundries. Radiator manufacturers have stepped up their pace moderately.

Birmingham, Ala.—Nine blast furnaces are now in production in this district on basic and foundry iron, with another scheduled, probably this week. Merchant iron producers have placed some orders for second quarter delivery. Surplus stocks of melters have been lightened considerably.

Toronto, Ont.—Business continues to make steady headway in the pig iron markets. Local blast furnace representatives state that sales are running well ahead of those reported for the earlier part of the year and the daily melt has been stepped up recently.

Scrap

Scrap Prices, Page 69

Pittsburgh—Heavy melting steel bought by a steel mill in this district at $12.50 has caused quotations on that grade to be marked down 25 cents per ton, carrying with it hydraulic compressed sheets and scrap rails. Railroad steel specialties and machine shop turnings have declined 50 cents per ton because of absence of mill buying. However, steel wheels and springs have been bought here by consumers at $14.25, and machine shop turnings are weak at $7.50 to $8. Nonetheless, reappearance of a down-river mill, the broker for which has paid $12 for heavy melting steel and hydraulic compressed sheets, has been a heartening influence in the market.

Cleveland—Shipments of steel and iron scrap have increased as melters have raised restriction but there is practically no buying. Current railroad offerings are relatively light. Prices show no change.

Chicago—Scrap continues to mark time with practically all mills out of the market. Prices are unchanged though heavy melting steel at $10.50 to $11 displays little strength. Offerings have been curtailed somewhat by the recent decline in prices, but sellers find little difficulty in covering orders in most grades, other than a few special items. Malleable scrap is one exception, continuing in fairly brisk demand.

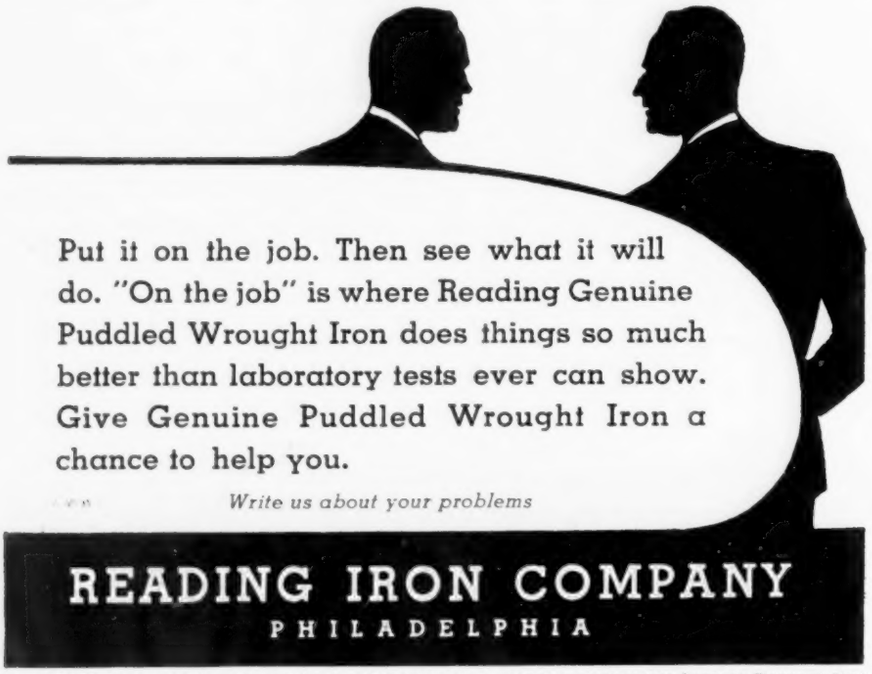
Boston—An easier tone prevails in scrap. For export, heavy melting steel is off 25 cents a ton, while turnings, skeleton and stove plate are inclined to weakness. Domestic buying for New England and outside has slumped, but purchasing for export holds fairly active. Chemical borings have not recovered from recent weakness.

New York—While heavy melting steel scrap prices for export are barely maintained, quotations for domestic shipment are off 25 to 50 cents a ton, reflecting weakness in the larger consuming centers drawing material from this district. Prices on such volume means little, however, in view of light business. Heavy breakable cast is 25 cents a ton lower. Heavier cast iron pipe requirements indicate larger purchasing by pipe foundries at an early date.

Philadelphia—Weakness continues in scrap, with reductions in several grades. No. 1 heavy melting steel is now holding at $11, delivered, consuming point; and No. 2 at $9 to $9.50. These two grades have also been reduced 50 cents a ton for export, dealers now offering $10 and $9, wharf, respectively, with uncertainty with regard to foreign exchange having a depressing influence on export business. A leading consumer of steel scrap in this district continues to hold up shipments, for about the sixth consecutive week.

Buffalo—Buying of scrap has ceased as a result of dealers refusing to sell at present offers, they claim. Holders of larger tonnage of material insist the minimum price for No. 1 heavy melting steel is $11 and are rejecting lower bids, it is said.

Detroit—After several weeks of decline, iron and steel scrap prices have remained stationary the past few days. While signs of weakness


Put it on the job. Then see what it will do. "On the job" is where Reading Genuine Puddled Wrought Iron does things so much better than laboratory tests ever can show. Give Genuine Puddled Wrought Iron a chance to help you.
Write us about your problems
READING IRON COMPANY
PHILADELPHIA
Science and Invention Have Never Found a Satisfactory Substitute for Genuine Puddled Wrought Iron

are not so evident, there is also no indication of renewed strength. Some steelmakers talk pessimistically of the near future. The outpouring of scrap from automobile plants has not abated. Prices remain on the basis of $8 to $8.20 for No. 1 melting steel and compressed sheets.

Cincinnati—Continued softness in iron and steel scrap has resulted in lowering of quotations 50 cents a ton, affecting all grades. Mills are accepting some shipments on contracts, but rejections are common. Mills show no interest in new commitments.

St. Louis — With melters purchasing only necessities and further attenuation in dealers' outstanding orders, extreme dullness prevails in iron and steel scrap, accompanied by general weakness, and specific price cuts affecting heavy melting steel, cast scrap, iron car wheels and several other grades.

Seattle—While Japan is apathetic exporting houses are firm on prices. No. 1 melting steel is quoted at $9.75 gross, f.a.s. and steel rails at $11.25. Domestic sales are small. Seattle has sold a quantity of steel borings at $2.08 a net ton.

Birmingham, Ala.—The scrap market is still dull, and so far, the increased production has moved comparatively little material from yards of dealers.

Toronto, Ont.—New business is improving gradually in the Canadian scrap markets. Steel scrap is the most active. Heavy melting steel has the principal call, but improvement is reported in a few other grades although turnings are slow. Foundries are taking cast and wrought scrap, but malleable and stove plate are dull. Dealers are buying special grades, but otherwise are out of the market. Prices are unchanged.

Warehouse

Warehouse Prices, Page 70

Pittsburgh—Warehouse buying is slightly ahead of the February rate. Prices hold steady and unchanged.

Cleveland—Warehouses are receiving a fairly regular number of orders, with tonnage little changed from the February average. March and October usually are the year's best months for warehouse business here. From present indications volume this month will not equal that of the same month last year. Prices are steady.

Chicago—Jobbers' sales continue fairly brisk, particularly in comparison with a year ago. A small improvement is shown compared with February. Prices are unchanged, but a revision in bolts and nuts is in prospect as the result of the increase in producers' quotations.

Boston—Warehouse volume has improved slightly, largely from better demand for outside miscellaneous needs. Pipe sellers also report gains. Buying from jobbers, however, is confined largely to well-spread miscellaneous requirements.

Philadelphia — Although an increase in warehouse trading this month is expected no evidences of this have as yet set in. Some leading jobbers, in fact, declare that their business since March 1 has not been up to the February rate. Prices are unchanged.

Detroit—Warehouse business in iron and steel holds tenaciously to the high level of January and February. It is well spread over a number of products and in point of orders.

Cincinnati—Jobbers here are encouraged by a modest number of inquiries for building materials, with possibility of a spring revival in these items. Industrial demand is maintained, with total tonnage on an even trend.

St. Louis—Warehouse sales in February were approximately one-fourth greater than for the same period in 1934, and 8 to 10 per cent in excess of January this year.

Seattle—Business is improving for warehouses. February showed an increase over January and both months are far ahead of 1934. Buying is mainly in small tonnages.

Ferroalloys

Ferroalloy Prices, Page 68

New York—While chrome ore prices have been tending upward, the $18 price on 48-50 per cent material has not entirely disappeared. Hence, an unusually wide spread now prevails, considering the ores of different origin.

Ferromanganese shipments have been fairly steady, with an upward trend now expected before there is any further recession. Contracts for second quarter continue to be made at the unchanged price of $85, duty paid, Atlantic and Gulf ports. Domestic spiegeleisen, 19 to 21 per cent, is $26, Palmerton, Pa., on lots up to 50 tons; $24 on 50 tons and over.

Iron Ore

Iron Ore Prices, Page 69

Cleveland—Inquiries have not yet been issued for Lake Superior iron ore, and prices have not been determined. Producers expect the market will develop slowly, users' stocks be-

CROSBY STAMPINGS

Since 1896 the Crosby plant has been devoted, exclusively, to designing and producing Sheet Metal Stampings. Avail yourself of this experience. Send us your next stamping problem and watch results.

Manufacturers IDEAL TROLLEY WHEELS

THE CROSBY COMPANY
BUFFALO, N. Y.

Branch Offices

New York, Philadelphia, Cleveland, Detroit, Chicago.

ing ample. Shipments from Lake Erie ports to interior furnaces in February amounted to 158,974 tons, compared with 70,531 tons in the month last year. The Lake Superior Iron Ore association reports receipts at these ports, and shipments therefrom for the 12 months ending with February, and dock balances March 1, as follows:

	Receipts	Shipments	Dock bal. March 1
Buffalo	1,630,319	8,546	2,897
Erie	902,533	933,443	100,687
Conneaut	3,294,610	3,309,420	1,846,741
Ashtabula	1,742,708	1,891,252	1,355,384
Fairport	678,722	683,905	387,403
Cleveland	4,035,905	2,683,638	823,068
Lorain	2,106,963	1,165,259	12,527
Huron	396,321	108,307	326,227
Toledo	784,442	401,127	12,649
Total	15,572,523	11,484,897	4,867,583
Year ago	16,323,050	12,145,673	5,175,886

Fluorspar

Fluorspar Prices, Page 68

Cleveland—Gravel fluorspar has been reduced $2.50 per net ton to $13, carloads, f.o.b. Kentucky and Illinois mines for all-rail movement; and $2.50 to $15 for barge. No. 2 lump fluorspar has been reduced similarly to $13 to $14.

Nonferrous Metals

Nonferrous Metal Prices, Page 68

New York—Foreign copper producers arrived in this country Friday and are expected to hold formal meetings with American producers in an effort to formulate a world marketing agreement. It is understood unofficially that they are close to agreement on the amount of American metal to be exported to foreign markets. It is also understood that the subject of foreign output curtailment has also been pretty well decided upon as a result of preliminary meetings.

Copper—Sales were in moderate volume last week following the active pace set last month. Total through Thursday for the current month was 7205 tons, or slightly over 1000 as a daily average. Buying was mainly for actual requirements of consumers, placing the trade on a sound business basis. A favorable outcome of the world conference is expected to lift foreign prices and stimulate demand for copper abroad.

Lead—Demand held up well with most leading sellers equally their intakes from day to day. Prices held steady at 3.40c, East St. Louis, and 3.55c, New York. St. Joseph Lead Co. continued to ask $1 premium on the latter basis.

Zinc—Prices firmed at the higher level of 3.90c, East St. Louis, for prime western and a further advance in prices is looked for. Sales were lighter than for the previous week when 7300 tons of slab zinc moved, of which about 6600 tons was prime western.

Antimony—Prices were generally nominal and unchanged on the basis of 14.50c, duty paid, for Chinese spot.

Tin—Straits tin prices were unsettled and depressed by weakness in the London market and wide fluctuations in the pound sterling exchange rates. Sales were limited. Spot Straits was quoted 47.35c Monday, 46.60c Wednesday and around 47.40c toward the end of the week.

Aluminum—Market was quiet, with metal still available at 19.00c to 21.00c, delivered for ninety-nine per cent plus.

Steel in Europe

Foreign Steel Prices, Page 70

London—(*By Radio*)—The British market for foundry pig iron is dull, and concessions are being offered to stimulate exports. Domestic demand hematite pig iron is more active. Middlesbrough steelworks are well occupied on contracts on books, but works in the Midlands are relying principally on spot orders. Trade in tin plate is only fair. Sales of galvanized sheets are being made for delivery to India and Australia, but in other directions the market is quiet.

Notice has been given of expiration of the continental tube cartel and it is uncertain whether it will be renewed. Export trade of the Continent is dull, best activity being shown by buyers for China.

Meetings

(*Continued from Page* 18)

Thomson works of Carnegie Steel Co., in addition to the Homestead men. Speakers included Ralph H. Watson, vice president, United States Steel Corp.; L. H. Burnett and James E. Lose, vice presidents, Carnegie Steel Co.; M. F. McConnell, general superintendent, Homestead works; and numerous other Carnegie officials.

RAILROAD NOTABLES ATTEND TRAFFIC CLUB DINNER

Thirty-fourth annual dinner of the Traffic Club of Pittsburgh was held at the William Penn hotel, March 7. Senator Burton K. Wheeler of Montana, spoke on, "The National Transportation Outlook." Among those who attended were:

F. E. Williamson, president, New York Central Lines, New York; J. J. Pelley, president, Association of American Railroads, New York; H. S. Palmer, president, New York, New Haven & Hartford railroad, New Haven; M. W. Clements and J. F. Deasy, vice presidents, Pennsylvania railroad, Philadelphia; Captain E. V. Rickenbacker, vice president and general manager, Eastern Air Lines, New York; Henry B. Dupont, chairman, Transcontinental and Western Air, Wilmington, Del.; W. C. Dickerman, president, American Locomotive Works, New York; C. J. Hardy, president, American Car & Foundry Co., New York; J. M. Barringer III, chief,

A BUSINESS ADDRESS OF Distinction and Convenience

Single Rooms from $4
Suites from . . . $12

THE BILTMORE

At the Biltmore you will find representative men of the steel industry, as well as of other leading lines of business, who have been attracted to this hotel by its convenience and the modern completeness of its facilities . . . For both personal comfort and business prestige make the Biltmore your own headquarters in New York.

THE BILTMORE

MADISON AVENUE AT 43RD STREET, NEW YORK

David B. Mulligan, *President*

Reconstruction Finance Corp., Washington; I. G. Flaccus, president, Diamond Alkali Co.; E. T. Weir, president, Weirton Steel Co.; S. E. Hackett, president, Jones & Laughlin Steel Corp., Pittsburgh; A. W. Robertson, chairman of the board, and F. A. Merrick, president, Westinghouse Electric & Mfg. Co.; and Baird Tewksbury, president, Midland Steamship Co.

NRA

CHIEF developments at NRA last week included:

Chain manufacturing industry code submitted an article on liquidated damages, permitting an agreement on its point by the members of the industry provided NRA consents.

Code authority for the roofing and sheet metal division of the construction industry has submitted amendments more clearly defining the scope of this branch of the industry.

Code authority for the vitreous enameled ware industry has proposed an amendment to its code deleting a mandatory low-cost sales prohibition.

Budgets received—Foundry equipment industry, $4983 for Jan. 1 to June 16; die casting industry, $16,000 for year begining March 18.

Financial

A PROTECTIVE committee for holders of preferred stock of the Baldwin Locomotive Works, Eddystone, Pa., has been created following the petition to organize under bankruptcy act (STEEL, March 4, p. 97)

On this committee are Harrison Hoblitzelle, president, General Steel Castings Corp.; Samuel M. Vauclain, chairman, Baldwin Locomotive Works, and the following Philadelphia bankers: John W. Converse, William C. Harter, George H. Stuart, William M. Potts and S. Powell Griffitts.

LUDLUM REPORTS PROGRESS

Ludlum Steel Co., Watervliet, N. Y., reports for 1934 net profit from operations totaling $397,438 and, after other income, income deductions and estimated federal income tax, a net profit of $442,347. Other pertinent data for 1934: Net sales $4,709,338; gross profit $1,696,775; profit from operations before depreciation and taxes $629,001; balance of capital surplus Dec. 31 $1,983,634.

Following arrangements with Acme Steel Co., Chicago; Superior Steel Corp., Pittsburgh; Wallingford Steel Co., Wallingford, Conn.; and John A. Roebling Sons' Co., Trenton, N. J., to supply them with semi-finished stainless steel, the export field, especially Latin America and the Far East, is receiving attention from Ludlum. Generally, new markets are opening up and the steel industry is going through a cycle of change, according to H. G. Batcheller, president.

BUSINESS PROSPECTS BETTER AS WASHINGTON FADES OUT

"We find our business prospects looking better than at any time since the depression began and we believe there is a large pentup demand for steel plant machinery to replace worn out and obsolete installations which have served their day and must give way to more modern equipment," declared John A. Penton, chairman, and G. W. Burrell, president, the Wellman Engineering Co., Cleveland, in submitting the annual report of the company to stockholders last week.

"It is a helpful sign that fewer business leaders today are looking to politicians for any help to industry and are endeavoring to make progress in spite of Washington influences."

Gulf States Steel Co., Gadsden, Ala., reports net loss of $58,039, after charges, in 1934, compared with a net of $193,041 in 1933.

Sharon Steel Hoop Co., Sharon, Pa., shows net loss of $10,667 in 1934, after charges, against a deficit of $274,781 in 1933.

CRANE NET OVER MILLION

Crane Co., Chicago, and subsidiaries, showed a profit of $1,021,543 for 1934, the first profit for the company since 1930. A net loss of $1,874,823 was reported in 1933.

Hexcel Radiator Co. has moved its plant and offices from Milwaukee to Racine, Wis. The company manufactures radiators and cooling systems for internal combustion engines.

Mirrors of Motordom

(*Continued from page 20*)

against any such radical mechanical change next year.

So severe is the draw on the turret tops that it is natural for a strain to be set up in the steel. Then, when the top is welded to the support and other body parts, the heat generated in welding tends to relieve the strain, and warping results. This situation, however, is being rapidly overcome, and appears to have been more difficult in welding Chevrolet than Olds and Pontiac tops, of the same design.

Packard also has encountered unique problems in flash welding its front end assemblies on the new low-price line. Even President Macauley has gone into the shop and taken a hand in the matter.

Incidentally, Mr. Macauley's first love is mechanics, and at his home he has a complete machine shop where he makes fishing rods and other paraphernalia, even to the extent of chrome plating them at home. Packard last week got up to 125 on the new series.

Welding has been employed by the General Motors Export Corp. in a unique manner to meet new market conditions, especially in South America and the Far East.

There, it appears, birth control is not practiced, if known, and the result is large families. Also, the family spirit is more pronounced; when a ride is taken the entire family must go; and there is difficulty stuffing a 7-passenger family into a low-price car.

Obviously, the cost of dies is too great to warrant General Motors

FOUNDED WATERBURY FARREL 1851

POWER PRESSES

AND OTHER CUTTING-UP SHOP MACHINERY

Which includes Single and Double-Acting Crank Presses; Cam Presses; Multiple Plunger Presses; Knuckle Joint or Toggle Presses; Foot and Screw Presses; Shearing Presses and Slitters; Press Attachments; and Lathes for Shells, including Thread Rolling Machines.

The Waterbury Farrel Foundry and Machine Company

Waterbury, Connecticut, U. S. A.

OFFICES

CLEVELAND CHICAGO PHILADELPHIA

manufacturing seven-passenger Chevrolets, Pontiacs and Oldsmobiles for the export trade, so a plan for "stretching" these lines has been developed.

It is easy to use longer channels for the sides of frames and to lengthen drive shafts. The problem of lengthening bodies has been overcome in this manner: Turret tops and doors are shipped to a metal-working interest which slits them crosswise of the car, and then welds in an insert, usually about 7 inches wide. This is just sufficient to permit two bucket seats to be attached to the rear of the front seat and converts these comparatively small cars into seven-passenger units.

General Motors' swing to all-steel tops, as a matter of side interest, has hit the Fisher Body woodworking plant at Memphis a hard blow. The Kelsey wood wheel plant there also has suffered from the fashion for steel spoke wheels. Kelsey also has lost some Chevrolet wire wheel business, as Chevrolet is now making this type in its own plant.

DESOTO affords a case study of a comeback in the automobile industry.

In December, January and February 11,939 airflow and airstream models have been shipped by this maker, compared with a total of 13,861 in the 1934 season. In other words, in three months DeSoto has practically matched its entire last year's business.

In nine weeks ended with March 2, retail deliveries of DeSotos numbered 3000, or six times the volume in the corresponding period a year ago. Last year, of course, DeSoto had only the radical airflow models to offer; this year it also has the more conservative airstream line. But more airflows are being sold this year than last, and their ratio to the airstream line is as 1 to 2.

For that matter, there is another reason why Chrysler common is being touted as a good buy in Detroit. The corporation as a whole shipped 82,876 units in January and 80,277 in February, a total of 163,153, or 97 per cent more than the 82,685 shipped in the same months of 1934.

PLYMOUTH ALMOST DOUBLES

Plymouth, for example, reports factory sales, or shipments, of 48,467 in January and 42,874 in February, an aggregate of 91,341, against only 52,185 a year ago. Since the present series was put in production in November, output prior to Jan. 1 was 35,000, making 126,000 new Plymouths made thus far in the model year.

Retail sales for 1935 to March 2 aggregated 53,709, compared with 28,249 in the like period a year ago. There is a rumor that Plymouth is redesigning its rear seat to make a compartment for luggage behind it, as is now featured in some Dodge models. However, the models with trunks have been leading sales.

There appears to be a little competitive spirit as regards luggage space. Hudson-Terraplane was first, in 1934, it will be recalled, with a compartment at the rear to enclose the spare tire and also provide room for bags etc. Many other manufacturers have followed this lead.

Two weeks ago, Hudson-Terraplane dramatized this space by broadcasting press photos showing four milk cans amply accommodated in the rear compartment. Now, an airstream DeSoto is shown with two elephants apparently greatly pleased on finding room for most their trunks in this (literally) trunk compartment.

General Motors Truck has sat back long enough watching Chevrolet and Pontiac sales swelled by volume sales to taxicab operators in the larger cities; it will soon offer a taxi under $1000.

A C Spark Plug division of General Motors has rarely been busier. For one thing, it has shipped 65,000 plugs daily to Ford.

Subject, of course, to the vagaries of Henry Ford, the latest word about the new medium-price car which the Lincoln company is planning to bring out is that it will be a V-12, to be priced about $1500, Detroit, and to be introduced about the middle of May.

WHEN HUEY MEETS HENRY!

Huey P. Long, senator and "kingfish" from Louisiana, in his radio blast Thursday night told how his share-the-wealth program would take care of Henry Ford. Huey said that, assuming Henry Ford owned $2,000,000,000, as represented by the Ford Motor Co., he would be allowed to keep $4,000,000 of this total and the government would confiscate $1,996,000,000 for distribution to the people. In other words, the less fortunate would all get a slice of the Ford Motor Co. to keep them from starving. Huey didn't elaborate on the question of who would keep the company going after he had seized about 99 per cent of it.

These Springs Look Alike

This spring has a long, and useful life of one hundred million or more compressions.

This spring may fail before reaching one hundred thousand compressions.

THE DIFFERENCE?

Here

Carefully selected materials; Proper design and manufacturing methods; controlled heat-treating; and the Fifty Years Experience of

RAYMOND MFG. CO.
Corry, Pa.
Producers of Superior Springs

Here

Ordinary spring wire, Out-of-date methods, poorly regulated heat treatment, lack of broad experience, produce the ordinary spring, perhaps useful fifty years ago, but worse than useless in the high grade engineered products of today.

Equipment

New York—Inquiry for machinery is in excess of orders, purchasing having been delayed on considerable equipment already figured. Orders for private industrial requirements are for one or two machines at a time, although the volume of such orders holds to the recent rate. An encouraging feature is the better volume of heavier equipment up for bids. For the Philadelphia navy yard a fair list of tools is active, including grinding, milling and lathe units. Bids on these close next week.

Cleveland—Equipment buying in this district is proceeding at a fair rate, with a few bright spots in the general picture. Cleveland Tractor Co. has installed a new furnace, lathes and milling machines, to replace obsolete equipment. Cleveland Graphite Bronze Co., working three 8-hour shifts, has purchased a few additional tools. White Motor Co. is reported to be planning the introduction of a new low-priced truck.

but whether or not additional equipment will be needed is not known.

Pittsburgh—Plans are in progress by the Niles Rolling Mill Co., Niles, O., to purchase new equipment, including a three-high breakdown mill and automatic feeder and catcher tables, as well as shears. This mill, which expects to be in operation in another two months, may also rehabilitate some sheet mill equipment at an idle valley mill. Steel mill equipment interests are actively figuring a large continuous strip mill at the Gary, Ind., works of American Sheet & Tin Plate Co., and cost estimates were being taken up through last week. A fairly large rolling mill order for export was closed on recently by a Pittsburgh equipment builder with details to be divulged later. Mesta Machine Co., having begun work on the Bethlehem Steel Co. mill for Lackawanna, N. Y., works, expects to have completed the order by Dec. 15.

Westinghouse Electric & Mfg. Co. has been awarded four large oil circuit breakers for the Boulder dam generating station. Manufacture will begin immediately at the East Pittsburgh, Pa., works on this contract, valued at approximately $500,000.

Seattle—General contractors at Coulee dam have already expended $2,815,115 for power shovels, buckets, tractors, trucks, conveyors, derricks, machinery, conveyor system and electrical equipment. Reclamation bureau, Denver, will open bids March 21 for electric storage water heaters and electric heaters for Coulee dam. Equipment interests report a good volume of trade as gold operations increase, the outlook for the season in Alaska being particularly promising.

Chicago—Machinery and plant equipment markets continue to make a favorable comparison with activity a year ago despite some hesitancy in demand for certain items recently. Machine tool buying still lags somewhat, but sellers are confident. Inquiries remain in fair volume but usually are for only a few items. Steel mills have become increasingly busy so far this year on plant rehabilitation programs, these concerning rolling divisions principally. It is reported that construction for United States Steel Corp. subsidiaries at Gary, Ind., may include a new power plant. Inland Steel Co., which recently awarded contract for rebuilding a blooming mill, is expected to install some new stands on existing sheet mill equipment.

Boston—New England machinery builders have submitted bids on a large part of the inquiry covering 185 tools, closing this week with the chief of ordnance, Washington, most of the equipment being for arsenal shops. Included are turret lathes, milling machines, shapers, grinding machinery, engine lathes and boring mills. This is the largest inquiry since the heavy purchasing by the same department several months ago, much of which was awarded machinery shops in this district, furnishing backlogs on which some plants are now operating. Outside of government inquiry, a fair volume of plant equipment for private industry has been figured, although orders have been coming for one or two tools at a time.

New England High Carbon Wire Co., Millbury, Mass., has purchased a new furnace for heat treating high-carbon wire from the Dempsey Furnace Co. Inc., New York, and is completing an addition to its plant to house the equipment.

Construction and Enterprise

Ohio

BARBERTON, O.—Lincoln Rubber Co., 941 Wooster road, recently damaged by fire, is preparing plans for erection of a new plant.

CLEVELAND — Cleveland Metal Spray & Supply Co. has been incorporated by Earl C. Krueger, Esther K. Wassner and Laura M. Weaver. Correspondent: Krueger, Rosine & Moore, Feick building, Sandusky, O.

CLEVELAND—Austin Co., 16112 Euclid avenue, has been commissioned to design and build a chain of all-metal gasoline service stations for the Ohio Oil Co. of Findlay, O. The stations will cost about $100,000. Each station will call for approximately 15 tons of iron and steel and will be constructed with prefabricated sections.

NILES, O.—Niles Rolling Mill Co. has acquired the Falcon plant of the Empire Sheet & Tin Plate Co. and will expend about $200,000 in modernizing the four continuous furnaces, and installing a 3-high breakdown mill as well as automatic feeding, catching and automatic shear equipment. (See page 18)

New York

NEW YORK—Mohican Steel Co. has leased a building at the southwest corner of Forty-seventh avenue and Thirtieth place, Long Island City, N. Y., for the warehousing of construction steel.

ALBION, N. Y.—Ryan Stone Co. Inc. has been incorporated to manufacture machinery and tools, by James H. Ryan, 117 South Main street, Albion, N. Y.

New Jersey

BELLEVILLE, N. J.—Isolantite Inc., R. F. Bicknell, vice president and general manager, has acquired the Lyons Storage Battery Co. plant here, to provide additional facilities for its rapid expansion in the manufacture of insulating materials.

ELIZABETH, N. J.—Wilson-Jones Co. is planning to install motors, controls and other equipment in the new addition to its local paper converting plant. Cost is estimated at $150,000.

New England

MERIDEN, CONN. — Tredennick Paint Mfg. Co., Edward Tredennick president, 301 South Colony street, is planning to construct a plant to replace the one damaged by fire. Estimated cost $30,000.

Pennsylvania

GROVE CITY, PA.—Sharon Coal & Limestone Co., has authorized elec-

CHICAGO'S
GREATEST
HOTEL
VALUE
Hotel
SHERMAN
In The Heart of
Chicago's Rialto—
Close To Offices
and R. R. Stations
RATES
from $2.50
Favorite Chicago
home of American
Business Men

DRIVE
Your Car
Right into
the Hotel
Sherman
HOME OF THE
COLLEGE
INN

trification of coal mine No. 2 near here, with installation of new equipment, including motors, controls, electric hoists, etc.

Indiana

JEFFERSONVILLE, IND.—Indiana Paving Materials Co. Inc. has been formed to manufacture and sell road construction equipment, by W. S. Smith, H. D. Snepp Jr., and J. W. Bruner, the latter being named resident agent.

SOUTH BEND, IND.—Wickman Brass Works Inc., 1703 Ironwood drive has been incorporated to deal in bronze, brass, copper, aluminum and other metals, by William B. Wickman, Herman R. Larson, William W. Hoover, Bert Sanders, Selby I. Lee and Thomas J. Smanda.

Illinois

CHICAGO—General Steel Warehouse Co. Inc., care of the Corporation Trust Co., 208 South LaSalle street, has been incorporated to deal in iron, steel and other metals, by Walter Watson, Gilbert H. Cooper and Leonard A. Hardell.

CHICAGO—Triple Seal Mfg. Co., 4820 West Division street, has been incorporated to manufacture mechanical packing and sealing devices for pumps, engines, compressors, elevator heads and other machinery, by Henry M. Wilcox, Lyndhurst E. Dufur and Nels Olsen. Correspondent: Oscar Thononder, 111 West Washington street.

CHICAGO—Corey Steel Co., warehouse seller of steel products, has acquired a block of land at Twenty-eighth street and Lombard avenue, formerly occupied by the Cooney Mfg. Co. The property includes a group of one-story buildings, a large part of which the company will occupy for its warehouse and offices. The company's address recently was 1834 South Fifty-fourth avenue.

SPARTA, ILL.—City officials will take bids in about 60 days on an addition to the water filtration plant, including a building addition and new filter equipment. Improvements are expected to cost about $25,000.

Alabama

STEVENSON, ALA.—W. W. Allison, mayor, will take bids March 15 for waterworks improvements, including construction of building for deep well and building for proportional chlorinator, installation of deep well pump and motor, etc.

District of Columbia

WASHINGTON—Chief of ordnance, United States army, will ask bids until March 13, circular 26, for one air compressor; March 14, circular 29, for three gas-electric generator sets.

Kentucky

ARLINGTON, KY.—Town clerk T. C. Bright will receive bids until March 21 on waterworks improvements for which PWA funds of $38,000 have been allotted. Included will be a distribution system, two small pump houses, two wells fully equipped with pumps, and a 75,000-gallon steel tank on tower.

LOUISVILLE, KY.—Louisville Gas & Electric Co., A. W. Lee vice president in charge of operations, will expend $507,344 for improvements in 1935, including reconstruction of 66,000 volt belt line at a cost of $47,000, moving Campbell street substation, $83,000; and replacing Crane-Ohio Falls plant, $20,000. Remainder of expenditures will be for routine extensions and reconstruction of gas and electric distribution system.

MADISONVILLE, KY.—City Clerk E. L. Clayton Jr. will open bids March 15 on complete waterworks, filtration and pumping plant. Work will be divided into two contracts. Contract No. 1 will include filtration and pumping plant complete, and contract No. 2 the furnishing and delivering of four pumps and motors complete.

WINGO, KY.—City will receive bids until March 22 on a waterworks system to include a distribution system with mains, valves and boxes, two small pump houses, two wells with pumps and a 75,000-gallon steel tank on 100-foot tower. Project will cost about $36,000.

Maryland

BALTIMORE—Federal Tin Co., Charles and Barre streets, has leased a 6-story warehouse at 6-10 East Lee street for expansion purposes and will convert it into a factory, installing a freight elevator and heating plant. Will expend about $30,000.

Mississippi

JACKSON, MISS.—United States Corrugated Box Co., Indianapolis, is receiving bids on a steel building to house its new corrugated box plant which it expects to build here in the near future. W. M. Snyder, attorney, New Merchants Bank building, Jackson, Miss. (Noted March 4)

RIPLEY, MISS.—Board of aldermen plans $65,000 improvements to present waterworks system, including 75,000-gallon elevated steel tank, pumping plant, 1525 feet of 8-inch, 15,490 feet of 6-inch, 11,300 feet of 4-inch, and 11,100 feet of 2-inch cast iron pipe. A. H. Beard, Beard Engineering Co., Clayton, Mo., engineer.

North Carolina

HIGH POINT, N. C.—Clinard Milling Co. has been incorporated with $100,000 capital by J. W. Clinard and Gilbert H. Clinard.

South Carolina

CHARLESTON, S. C.—Navy department has authorized expenditure of $153,000 for purchase of machine tools and partial modernization of shops at navy yard.

ROCK HILL, S. C.—Rock Hill Bleachery & Dye Co. is planning to erect a boiler house. Robert & Co., engineer, Bona Allen building, Atlanta, Ga.

West Virginia

CHARLESTON, W. VA.—Westvaco Chlorine Products Co. Inc., M. G. Geiger superintendent, is planning to install a steam and power system at South Charleston.

NEW CUMBERLAND, W. VA.—Main power plant of the Hancock County Fire Clay Co., owned by M. W. Ballantyne, recently sustained damages by fire.

Virginia

SPERRYVILLE, VA.—City will vote March 26 on $25,000 waterworks bonds.

PORTSMOUTH, VA.—Bureau of yards and docks, navy department, Washington, will open bids March 13, specification 7881, for refrigerating plant at Norfolk navy hospital, including 8-inch well, two water pumps, refrigerating equipment and improvements to refrigerating rooms.

Missouri

ST. LOUIS — Excelsior Plating Works Inc. has been organized by Arthur G. Musick, and Michael Alfend, 1522 Chestnut street.

INDEPENDENCE, MO.—City will

UPSETTING EQUIPMENT FOR SALE

ONE — 7" TWIN GEAR AJAX UPSETTER
Serial No. 2622
Equipped for Belt Drive

ONE — 7" SINGLE GEAR AJAX UPSETTER
Serial No. 2123
Equipped for Tex-Rope Drive

Both machines in operation at present and in good running condition. Suitable for Pipe-Flanging, Crankshaft Upsetting or miscellaneous forging work. Available for immediate disposal. Subject to prior sale.

Prices on application

AMERICAN FORGE COMPANY
2621 South Hoyne Ave., CHICAGO, ILL.

WEIRTON

PRODUCERS OF: Pig Iron—Open Hearth Steel; Billets—Slabs—Sheet Bars—Skelp; Angles, Beams and Channels; Round, Square and Flat Bars; Rails—Steel Plates—Tie Plates—Track Spikes—Splice Bars—Reinforcing Bars; Coke Tin Plate; Kanners Special Cokes—Best Cokes—Charcoals; Lacquered Tinplate; Tin Mill Black Plate (All Finishes); Lacquered Black Plate; Copper Bearing Terne Plate; Hot and Cold Rolled Strip Steel and Strip Steel Sheets; High Finish Sheets; Long Terne Sheets (Common and Special Finishes); Galvanized Black and Blue Annealed Sheets; Corrugated Sheets, V Crimp Sheets, Roll Roofing; Single Pickled, Full Finished and Auto Body Sheets; Coke — Tar — Benzol — Toluol — Ammonium Sulphate.

SAVE WITH STEEL

WEIRTON STEEL CO.
Weirton W. Va.

Division of National Steel Corp.
Sales Offices in All Principal Cities

Simonds Cut Gears

SPUR—BEVEL—MITRE & WORM—RACK CUT TEETH—SPECIAL MACHINERY . .

Treated gears—cut and finished by Simonds—last longer, eliminate costly shut downs and work smoother and more efficiently.

Made in all sizes for any service and TREATED to meet your refuirements.

Also—
Ramsey Silent Chain Drives : Gates
Vulco Rope Drives : All Steel Silent
Pinions : Bakelite Silent Pinions

The SIMONDS MANUFACTURING Co.
25th STREET — PITTSBURGH, PA.

HOLCROFT & COMPANY

LEADERS IN BUILDING AND DESIGNING ELECTRIC AND COMBUSTION FURNACES, KILNS AND OVENS.
HOME OFFICE: DETROIT—BRANCHES: CHICAGO, PHILADELPHIA
CANADA: WALKER METAL PRODUCTS, LTD., WALKERVILLE, ONT.

BUILT BY HOLCROFT & COMPANY DETROIT-MICH.

BUSHINGS — SPACERS — TUBES — SLEEVES
Straight Seam or V Seam

For production or repairs

Any size up to 6" diameter x 18" long. Roller Bearing Sleeves—Any Quantity. Tell us how a tube is used, and we can make it if a Split Tube will do.

GIFFORD ENGINE CO.
Lansing, Mich.

JAMES CRISWELL COMPANY

Furnace Engineers & Contractors

Open Hearth, Soaking Pits and heating furnaces

Keenan Bldg. Pittsburgh, Pa.

JIGS — FIXTURES — SPECIAL MACHINES— PUNCHES—DIES—*"to your measure"!*

Let our trained engineers apply our 28 years' experience to your equipment problem. Our successes in other plants of all types, and proved methods assure a solution of any question involving production machinery. Write us in detail without obligation.

THE COLUMBUS DIE, TOOL AND MACHINE CO.
COLUMBUS, OHIO

Producer Gas Systems

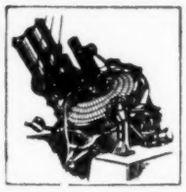
WE GUARANTEE RESULTS

Using Bituminous and Anthracite Coal, Raw and Scrubbed Gas, for Displacing Oil, City and Natural Gas Coal and Coke in furnaces of all descriptions.

Flinn & Dreffein Co.
308 W. Washington St. Chicago, Ill.

OLIVER

PITTSBURGH, PA.



Moore Rapid
LECTROMELT
Furnaces

Standard Sizes 25 lbs. to 100 Tons Capacity
Most Rapid and efficient for making
Tool Steels, Alloy Steels, Forging Steels
Steel Castings, Malleable Iron, Grey Iron, Carbide, Ferro-Alloys etc.
PITTSBURGH LECTROMELT FURNACE CORP.
P.O. BOX 1257, FOOT OF 32ND ST. PITTSBURGH, PA. U.S.A.

SC&H Furnaces are made for annealing, case hardening, carburizing, forging, cyaniding, lead hardening & oil tempering.

STRONG CARLISLE & HAMMOND
1400 W. 3rd St., Cleveland, O.

SC&H Furnaces are built in all sizes of Oven, Pot, Continuous, and Special Types for Electric, Oil or Gas application.

Boilers • Engines • Pumps
Turbines • Unit Heaters

MURRAY IRON WORKS COMPANY
65th Year of Continuous Operation
BURLINGTON, IOWA

STAINLESS STEEL SHEETS
AUTOMATICALLY POLISHED
ON
EXCELSIOR
STAINLESS STEEL POLISHING MACHINE
35 YEARS POLISHING MACHINE EXPERIENCE
ESTABLISHED 1892
EXCELSIOR TOOL & MACHINE CO
EAST ST. LOUIS, ILLINOIS
INCORPORATED 1902

take bids soon on boiler feed pumps, plant piping, air ducts, air preheater and other miscellaneous equipment for the municipal power plant. Estimated cost is $40,000 to $50,000.

Arkansas

BLYTHEVILLE, ARK.—Blytheville Canning Co., George Greb president, is planning to expend about $25,000 on expansion to its plant.

FORDYCE, ARK. — Walkerville Chair Co., Emerson, Ark., will move its plant here, and will operate as the Fordyce Chair Co.

Texas

DALLAS, TEX.—Parish Tool Corp. has been incorporated with $10,000 capital by D. S. Parrish and W. F. Hurst.

PORT ARTHUR, TEX.—City commission has authorized construction of pumping station costing $30,000. Robert Cooper, city manager.

PORT LAVACA, TEX.—City, F. M. Dudgeon mayor, has plans before PWA for approval of proposed power plant, 120 x 189 feet, including refrigeration, cold storage facilities. Garret Engineering Co., 308 Hughes street, Houston, Tex., engineer.

STOCKDALE, TEX.—City is completing plans for waterworks system, including erection of tank and tower, installation of pipe lines, valves, fire hydrants, pumping equipment etc. Grant of $34,000 has been approved. H. N. Tuley, Seguin, Tex., engineer.

TERRELL, TEX.—City, L. A. Markham city manager, will have plans ready for bids in June for installing sanitary sewer system and disposal plant, including 161,000 feet of sewer lines.

Wisconsin

WISCONSIN RAPIDS, WIS.—Pigeon River Lumber Co., care of John Jenswold Jr., 703 Palladio building, Duluth, plans hydroelectric power development on Pigeon river, comprising construction of series of dams, generating station, transmission lines and power substation for lumbering and wood pulp mills to be operated in neighboring district. Cost is estimated at $2,500,000.

LADYSMITH, WIS.—Stokely Bros. & Co., C. A. Nugent secretary will soon start construction of a 1-story canning plant, 130 x 290 feet, to replace plant which burned recently.

CEDARBURG, WIS. — Cedarburg Canning Co. will soon start construction of a 3-story canning plant, 80 x 200 feet.

PLYMOUTH, WIS.—Plymouth Factory Furniture Co., R. A. Bade general manager, will build a 1-story factory, 50 x 150 feet. A. C. Fehlow, 717 North State street, Chicago, is architect.

MARSHFIELD, WIS. — George Marvin, secretary of water and light commission, will receive bids until March 14 for improvements to municipal light and power plant, including addition to boiler house, new boiler auxiliary stoker, coal and ash handling equipment, boiler feed pumping equipment, etc (Noted Feb. 25)

Minnesota

MINNEAPOLIS — Flexsteel Spring Corp. has been organized as the successor to the Sanitas Spring Mfg. Co., and has moved its plant from St. Paul to larger factory quarters at 800 Sixteenth avenue, southeast, Minneapolis. E. W. Schlappritzi is president.

MINNEAPOLIS—Wallace Mfg. Co. has been incorporated with capital stock of $50,000 to manufacture electrical equipment, by Wallace J. Schulz, H. H. Morrill and Carl Stein.

MINNEAPOLIS—Brown Steel Tank Co. has been incorporated to manufacture steel tanks of all types and other metal products, by Walter V. Brown and Arthur E. Brown. The company has taken over the plant of the former Northwestern Steel & Iron Corp., 2943 Fourth street, southeast.

MINNEAPOLIS — Hubbard Co., manufacturer of Hubbard oil burners, has organized an air conditioning department for the manufacture of a new type of air conditioning system. New factory space has been obtained, and the company is in the market for sheet metal tools and machinery.

ST. PAUL—National Wire Cloth Co., manufacturer of wire cloth for sand and gravel plants, mining, cement mills, etc., has started production of a new wire cloth made of a high grade spring steel.

ST. PAUL—Northern Pacific Transport Co., subsidiary of Northern Pacific Railway Co., is expending $200,000 for bus, truck and combination bus and truck equipment in the establishment of a state-wide system of highway transportation in Montana to be co-ordinated with the company's railway service in that state. Busses to be used will be of the all-steel welded body type.

South Dakota

MILBANK, S. DAK. — Dakota Granite Co. is rebuilding its power plant and work shop to replace buildings damaged by fire. New and modern machinery and equipment will be installed in the work shop.

Iowa

LAMONI, IOWA—Martin A. Hynden, town clerk, will receive bids until March 26 for construction of a municipal light and power plant to cost $100,000, including two diesel engines with combined capacity of 600 horsepower with electric generators having combined capacity of not less than 400 kilowatts. Alternate bids will be received on two diesel engines having combined capacity of 480-horsepower, with electric generators having combined capacity of 320-kilowatts.

WAUKON, IOWA—City has authorized Young & Stanley, consulting engineers, Muscatine, Iowa, to make surveys and estimates of cost for new city-owned electric light and power plant.

Michigan

DETROIT—National Steel Corp., Grant building, Pittsburgh, is reported completing plans for a continuous wide sheet-strip mill at its Great Lakes division at Ecorse, Mich. A new mill building will be erected.

Montana

BOZEMAN, MONT.—Architect F. F. Willson has completed plans for the $265,000 Gallatin county court house. Bids will be asked soon. This is a PWA project.

Nevada

KIMBERLY, NEV. — Consolidated Copper Mines Corp., 120 Broadway, New York, is planning to construct a copper refinery and mining and mill structures here. RFC loan has been granted for the project. Estimated cost $3,000,000.

Idaho

OROFINO, IDAHO — Washington-Idaho Lime Products Co., Spokane, is planning to install heavy-duty motors and controls, conveyors, loaders and other equipment in its proposed new cement mill here. Cost about $400,000.

Pacific Coast

LONG BEACH, CALIF.—Acme Machine Co., 2680 Atlantic avenue, is preparing plans for expansion of its plant for the production of a new device called the drillers guide, which registers the exact direction and inclination of the hole when drilling an oil well, without removing the drill pipe. Partners in the firm are A. T. Cooper and L. F. Valentine.

SAN FRANCISCO — Bradley & Ekstrom, 320 Market street, have leased the C. M. Langdon manganese property near Blythe, Calif., and expect to start shipments shortly.

STOCKTON, CALIF.—H. O. Thomas is rebuilding a garage structure at 1810 East Worth street here for conversion into a manufacturing plant to produce bakelite products.

STOCKTON, CALIF. — Harvester Parts Inc., 1120 East Weber avenue, has recently been organized to manufacture and distribute harvesting machinery parts. A. Paul Yancey is president.

OSWEGO, OREG.—City council has opened bids for furnishing a deep well turbine pump.

PORT ORFORD, OREG.—James A. Vandegrift, chief engineer, has announced that eastern capitalists are planning to develop this port, the outlet for the Port Orford cedar of Curry county, which lacks a railroad. Immediate improvements include a $10,000 administration building, a $140,000 lumber plant, and construction of 95 miles of railroad to connect with the Southern Pacific railway at Leland, Oreg.

CATHLAMET, WASH.—Work of constructing a sawmill will begin next month, the output of which will be taken by the International Wood Products Co., which in preparation for increased output, will enlarge its facilities including a new slicing machine and eight steel steam boxes.

KENNEWICK, WASH.—Kennewick Canning Co. has a new plant under construction, to be completed about May 1.

MARYSVILLE, WASH.—City officials have signed with federal agencies for a loan and grant of $57,000 for waterworks improvements. Call for bids awaits final official approval.

SEATTLE—Machine shops and wharf terminals of the American-Pacific Whaling Co. at Bellevue, Wash., were damaged by fire March 1. Future plans have not yet been announced.

SPOKANE—Continental Gold-Silver Mining Co., 415 Hyde building, has been organized by George G. Davis and associates, with capital of $50,000.

WENATCHEE, WASH.—Wenatchee Garbage Disposal Co. is planning to erect a concrete incinerator plant to house offices and equipment. The improvement includes a 1½ mile pipe line.

SCREENS of Perforated Metal

The Harrington & King PERFORATING Co.

5634 Filmore St., Chicago, Ill.
New York Office—114 Liberty St.

BELMONT IRON WORKS
PHILADELPHIA · NEW YORK · EDDYSTONE

Engineers - Contractors - Exporters
STRUCTURAL STEEL — BUILDINGS & BRIDGES
RIVETED—ARC WELDED
BELMONT INTERLOCKING CHANNEL FLOOR
Write For Catalogue
Main Office—Phila. Pa. New York Office—44 Whitehall St.

LEE-BUILT TRADE MARK SPRINGS

STAINLESS STEEL SPRINGS *by* LEE

LEE SPRING CO., INC., 31 Main St., Brooklyn, N.Y.

THE OHIO STRUCTURAL STEEL CO.
NEWTON FALLS, OHIO

Engineers, Fabricators & Erectors of Steel Construction

RYERSON~STEEL

Immediate shipment of all steel and allied products including bars, structurals, sheets, plates, special alloy, and tool steels, Allegheny metal, babbitt, boiler tubes and fittings, welding rod and equipment, metal working tools, etc. Write for the Ryerson Journal and Stock List.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

STAINLESS STEEL

ALSO
HIGH SPEED and CARBON TOOL STEEL
LATROBE ELECTRIC STEEL CO. LATROBE, Pa.

Pickling of Iron and Steel—*By Wallace G. Imhoff*

This book covers many phases of pickling room practice and construction and maintenance of pickling equipment.

Price Postpaid $5.15 (25s.6d.)

THE PENTON PUBLISHING CO.
Book Department
1213 W. 3rd St. Cleveland, O.

520-S.

Busy Executives Agree on The COMMODORE

New York's finest combination of convenience, time-saving efficiency, comfort and economy

In the heart of the city's greatest business zone. Express subway from lower lobby to all other districts

2000 quiet, restful, outside rooms —all with bath—from $3

RIGHT AT GRAND CENTRAL
NEW YORK CITY
FRANK J. CROHAN, *President*

NIAGARA
BRAND
FERRO-ALLOYS

FERRO-SILICON
ALL GRADES

FERRO-CHROMIUM
HIGH CARBON

FERRO-CHROMIUM
LOW CARBON

SILICO-MANGANESE

FERRO-MANGANESE

SERVICE
QUALITY
UNIFORMITY

PITTSBURGH METALLURGICAL
COMPANY, INCORPORATED
NIAGARA FALLS, NEW YORK

HANNA
PIG IRON

BRANDS:
Buffalo—Detroit—Susquehanna
GRADES:
Foundry—Malleable
Silvery—Ferro-Silicon

The HANNA FURNACE CORP.
MERCHANT PIG IRON DIVISION
OF NATIONAL STEEL CORP.
Buffalo, New York Detroit, Mich.
New York Philadelphia Boston

BROOKE
PIG IRON
E. & G. BROOKE IRON CO.
BIRDSBORO, PENNA.
MFGRS OF
HIGH GRADE
FOUNDRY
BASIC
GREY FORGE
MALLEABLE
BESSEMER
LOW PHOS.

CERTIFIED
MALLEABLE IRON CASTINGS
Detachable Sprocket Chain
Riveted Sprocket Chain
Malleable Washers, etc.
PEORIA MALLEABLE CASTINGS CO.
FT. ALEXANDER ST. PEORIA, ILLINOIS

The Shenango Furnace Company
Lake Superior Iron Ores
Bessemer, Non-Bessemer, Aluminiferous
Shenango Pig Iron
Bessemer, Basic, Malleable, Foundry
Coal and Coke
OLIVER BLDG., PITTSBURGH UNION TRUST BLDG., CLEVELAND
THE S F Co.

ONE-PIECE NON-SLIP
MAXIMUM VENTILATION
EASILY PAINTED · NO RATTLES
BLAW-KNOX STEEL GRATING
Write for Catalog 1333-A
BLAW-KNOX COMPANY
FARMERS BANK BLDG. PITTSBURGH, PA.

SMALL ELECTRIC STEEL CASTINGS
(Capacity 500 Tons per Month)
WEST STEEL CASTING CO.
CLEVELAND OHIO, U. S. A.
"He Profits Most Who Serves Best"
Better Steel Castings

LARGE USES OF STEEL IN SMALL WAYS —
VOLUME II
An invaluable reference guide for all interested in the steel and metal-working industries.

This volume contains 93 selected articles, all illustrated on the various and often obscure uses of steel. Each article covers three major phases of the product described, — the approximate amount of the material used, the character of the material, and the method of fabricating it.

Price $2.65 Postpaid

THE PENTON PUBLISHING CO.
1213 W. 3rd St. *Book Department* Cleveland, Ohio
303-S.

Classified

POSITIONS OFFERED
Single Insertion—50c per line
Three to Six Insertions—48c per line
Six or more Insertions—45c per line

Seven words of ordinary length make a line.
FIRST LINE IN BOLD FACE TYPE
A box number address counts as one line.

POSITIONS WANTED
Single Insertion—25c per line
Three to Six Insertions—24c per line
Six or more Insertions—23c per line

Bids Wanted

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., Feb. 28, 1935. Sealed bids in duplicate will be publicly opened in this office at 1 p. m., March 28, 1935, for furnishing all labor and materials and performing all work for construction of the U. S. P. O., Brooklyn Sta., at Cleveland, O. Attention is directed to the special conditions of bidding set forth in the specifications, and Bulletin No. 51 of the Federal Emergency Administration of Public Works and Executive Order No. 6646. Drawings and specifications, not exceeding 3 sets, may be obtained at this office in the discretion of the Assistant Director of Procurement, Public Works Branch, by any general contractor, and provided a deposit of $15 is made for each set to assure its prompt return. One set will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, provided a deposit of $15 is made to assure its prompt return. Checks offered as deposits must be made payable to the order of the Treasurer, U. S. Cash deposits will not be accepted. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch.

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., Feb. 27, 1935. Sealed bids in duplicate will be publicly opened in this office at 1 p. m., March 20, 1935, for furnishing all labor and materials and performing all work for the alteration of fifth story of U. S. P. O. & Ct. H., at Columbus, O. Attention is directed to the Executive Order No. 6646, dated March 14, 1934, and the special conditions of bidding set forth in the specification. Drawings and specifications, not exceeding 3 sets, may be obtained at this office in the discretion of the Assistant Director of Procurement, Public Works Branch, by any general contractor, and provided a deposit of $15 is made for each set to assure its prompt return. One set will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, provided a deposit of $15 is made to assure its prompt return. Checks offered as deposits must be made payable to the order of the Treasurer, U. S. Cash deposits will not be accepted. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch.

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., March 1, 1935. Sealed bids in duplicate will be publicly opened in this office at 1 p. m., March 29, 1935, for furnishing all labor and materials and performing all work for the construction of the U. S. P. O. Stn. E, Cleveland, O. Attention is directed to the special conditions of bidding set forth in the specifications, and Bulletin No. 51 of the Federal Emergency Administration of Public Works and Executive Order No. 6646. Drawings and specifications, not exceeding 3 sets, may be obtained at this office in the discretion of the Assistant Director of Procurement, Public Works Branch, by any general contractor, and provided a deposit of $15 is made for each set to assure its prompt return. One set will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, provided a deposit of $15 is made to assure its prompt return. Checks offered as deposits must be made payable to the order of the Treasurer, U. S. Cash deposits will not be accepted. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch.

Help Wanted

SALES REPRESENTATIVE—A LONG established company, marketing mechanical devices with modern sales methods, desires a man as sales representative; we feel that the proper man should be from thirty to thirty-five years old; our products are sold to mechanical and engineering departments of the producers of industrial and agricultural equipment as well as to operating departments of steel mills; the successful applicant should have a thorough engineering background, preferably in connection with steel mill equipment; the man who can qualify will be compensated on a salary basis plus traveling expenses; the territory is principally in Western Pennsylvania, parts of Ohio and West Virginia. Headquarters will be made in Pittsburgh. Considerable traveling will be involved, but trips will not be long extended; reply in detail giving past connections and where now employed; state age and salary expected; all replies treated in confidential manner. Address Box 198, STEEL, Penton Bldg., Cleveland.

WANTED—SALESMAN

familiar with steel casting trade. Give full particulars, including experience, age, etc. Address Box 207, STEEL, Penton Bldg., Cleveland.

Positions Wanted

FOREMAN UNDERSTANDS DIE MAKING, annealing, pickling, drawing, of stainless alloys, soft and tool steels. Also have had six years experience in cold rolling same. Address Box 200, STEEL, Penton Bldg., Cleveland.

POSITION WANTED AS MASTER MECHANIC or in charge of department or operation where mechanical ability would be useful. Competent to put in foundations, erect machinery and keep up maintenance work. Can organize and handle men. Best of references as to habits and ability. Address Box 204, STEEL, Penton Bldg., Cleveland.

TECHNICAL PURCHASING AGENT; TECHnical assistant to purchasing agent; sup't of equipment. Mechanical engineer, familiar steel products all types. Wide experience shops and mills. Excellent technical correspondent and mathematician. Address Box 206, STEEL, Penton Bldg., Cleveland.

SALES ENGINEER AND SALES MANAGER with 15 years experience in mechanical and structural fields. Has contacted all types of industries. Now located in Ohio. Desires new connection. Location immaterial. Address Box 208, STEEL, Penton Bldg., Cleveland.

FACTORY SUPERVISOR, BROAD EXPERIence in the manufacture of sheet metal products, desires position. Address Box 201, STEEL, Penton Bldg., Cleveland.

Positions Wanted

CAN YOU USE A MAN WITH 20 YEARS experience in the steel business? Familiar with tin plate, galvanized, terne, black, hot and cold rolled sheets and hot and cold rolled strip. Have knowledge of lacquers and their application to metal. Seven years operating experience, seven years traveling metallurgist and past six years sales. Have wide acquaintance in industrial field. Now employed but desire connection with company where knowledge can be applied with benefit to both. Age 39, married. Address Box 203, STEEL, Penton Bldg., Cleveland.

Employment Service

SALARIED POSITIONS
$2,500 to $25,000

This thoroughly organized advertising service, of 25 years' recognized standing and reputation carries on preliminary negotiations for positions of the caliber indicated, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If you have actually earned over $2,500, send only name and address for details. R. W. Bixby, Inc., 116 Delward Bldg., Buffalo, N. Y.

Equipment for Sale

BARGAIN—HYDRAULIC BALER—FOR SALE
Hydraulic, High Pressure, Alloy Scrap Baler. Produces 10" x 10" x 15" bale or smaller. Economical in operation. Full particulars on request. Address Box 202, STEEL, Penton Bldg., Cleveland.

Castings

OHIO

THE COMMERCIAL STEEL CASTINGS CO., Marion. Acid open hearth steel castings 5 lbs. to 10 tons. Shipping facilities on five railroads.

THE WEST STEEL CASTING CO., Cleveland. Fully equipped for any production problem. Two 1½ ton Elec. Furnaces. Makers of high grade light steel castings, also alloy castings subject to wear or high heat.

PENNSYLVANIA

NORTH WALES MACHINE CO. INC., NORTH Wales. Grey Iron, Nickel, Chrome, Molybdenum Alloys. Semi-steel. Superior quality machine and hand molded, sand blast and tumbled.

Stampings

MICHIGAN

LANSING STAMPING CO., 1171 Penn Ave., Lansing. Heavy, medium and light metal stampings. Send blue prints or samples for estimates.

• • ADVERTISING INDEX • •

Where-to-Buy Products index carried in first issue of month.

The star (*) indicates that the advertisement appears alternate weeks, the dagger (†) once a month.

	Page
†Acme Steel Co.	—
*Alan Wood Steel Co.	75
†Alpha Lux Co., Inc.	—
†American Bridge Co.	8
*American Chemical Paint Co.	—
American Forge Co.	86
†American Rolling Mill Co.	57
†American Sheet & Tin Plate Co.	45, 48
†American Steel & Wire Co.	45, 48
Andrews Steel Co.	—
†Anti-Borax Compound Co.	—
†Armstrong Blum Mfg. Co.	—
†Armstrong Cork Products Co.	—
Atlas Car & Mfg. Co.	—
†Bailey, Wm. M., Co.	—
Barnes-Gibson-Raymond, Inc.	—
*Beatty Machine & Mfg. Co.	—
Belmont Iron Works	89
Bethlehem Steel Co.	3
Biltmore Hotel	82
Bissett Steel Co., Inc.	—
Blaw-Knox Co.	90
*Bliss & Laughlin, Inc.	73
*Brooke, E. & G., Iron Co.	90
†Buell, Wm. C., Jr.	—
*Buffalo Wire Works Co., Inc.	—
†Burden Iron Co., The	—
†Cadman, A. W., Mfg. Co.	—
Carnegie Steel Co.	45, 48, 79
†Ceilcote Co.	—
Chain Belt Co.	—
Chambersburg Engineering Co.	—
†Chicago Rawhide Mfg. Co.	—
†Clark Controller Co.	—
Cleveland-Cliffs Iron Co.	—
†Climax Molybdenum Co.	12
*Columbus Die, Tool & Machine Co.	87
Commodore Hotel	89
Continental Steel Corp.	—
Cramp Brass and Iron Foundries Co.	—
†Criswell, James, Co.	87
Crosby Co.	81
Cunningham, M. E., Co.	—
†Curtis Pneumatic Machinery Co.	—
†Detroit Leland Hotel	—
Dietzel Lead Burning Co.	—
†Driver-Harris Co.	—
Electric Furnace Co.	Back Cover
*Electro Metallurgical Company	—
†Enterprise Galvanizing Co.	—
†Erie Foundry Co.	—
†Eureka Fire Brick Works	—
*Excelsior Tool & Machine Co.	87
Fafnir Bearing Co.	—
†Fairbanks, Morse & Co.	—
†Flinn & Dreffein Co.	87
Foote Bros. Gear & Machine Co.	—
Forging and Casting Corp.	—
Fort Pitt Spring Co.	—
General Electric Co.	5
General Electric Vapor Lamp Co.	—
†Gifford Engine Co.	87
Goodrich, B. F., Co.	—
†Granite City Steel Co.	—
†Gulf Refining Co.	—
Hanna Furnace Corp.	90
†Harnischfeger Corp.	—
Harrington & King Perforating Co., The	89
†Hauser-Stander Tank Co.	—
Hetz Construction Co.	—
†Hindley Mfg. Co.	—
†Holcroft & Co.	87
†Hyatt Roller Bearing Co.	—
†Hyde Park Foundry & Machine Co.	—
*Illinois Steel Co.	43, 45, 48
†Industrial Brownhoist Corp.	—
Ingersoll-Rand Co.	—
*Inland Steel Co.	10
*International Nickel Co.	54
Jones & Laughlin Steel Corp.	41
†Kardong Brothers, Inc.	—
†Kidd Drawn Steel Co.	—
†King Fifth Wheel Co.	—
Koppers Construction Co.	Inside Front Cover
*Laclede Steel Co.	—
Landis Machine Co.	—
†Landis Tool Co.	—
*Lansing Stamping Co.	—
Latrobe Electric Steel Co.	89
Lee Spring Co., Inc.	89
†Lewis Foundry & Machine Co.	—
†Lincoln Electric Co.	—
Linde Air Products Co.	6
†Link Belt Co.	76
†Ludlum Steel Co.	—
Lukens Steel Co.	—
†Mackintosh-Hemphill Co.	—
Macklin Co.	—
Magnetic Mfg. Co.	—
Mahr Mfg. Co.	—
Majestic Hotel	—
†Maurath, Inc.	78
†Medart Co., The	—
Mesta Machine Co.	—
Midvale Co., The	—
†Moltrup Steel Products Co.	Inside Front Cover
†Morgan Engineering Co.	51
†Murray Iron Works Co.	87
National Roll & Foundry Co.	—
National Tube Co.	45, 48
†New Departure Mfg. Co.	—
†Newport Rolling Mill	77
†Norton Co., The	59, 60
†Ohio Carbon Co.	—
†Ohio Ferro-Alloys Co.	—
*Ohio Structural Steel Co.	89
†Oliver Iron & Steel Corp.	87
Oxweld Acetylene Co.	—
Pacific Coast Steel Co.	—
Page Steel & Wire Co.	—
Peoria Malleable Castings Co.	90
†Perin Engineering Co., Inc.	—
†Pittsburgh Crushed Steel Co.	—
Pittsburgh Lectromelt Furnace Corp.	87
*Pittsburgh Metallurgical Co.	90
†Pittsburgh Rolls Corp.	—
Pittsburgh Tool, Knife & Mfg. Co.	—
†Pittsburgh Tool Steel Wire Co.	—
†Pressed Steel Tank Co.	—
Prest-O-Lite Co., Inc.	—
*Progressive Mfg. Co.	—
Propellair, Inc.	—
†Raymond Mfg. Co.	84
Reading Iron Co.	80
Republic Steel Corp.	4, 7
†Roebling's, John A., Sons Co.	—
Ryerson, Joseph T., & Son, Inc.	89
†Samuel, Frank, & Co., Inc.	—
*Seneca Wire & Mfg. Co.	—
†Shaw-Box Crane & Hoist Co., Inc.	—
*Shenango Furnace Co.	90
Sherman Hotel	85
Sherwin-Williams Co.	—
†Shuster, F. B., Co., The	—
Simonds Mfg. Co.	87
†S. K. F. Industries, Inc.	—
Socony-Vacuum Oil Co.	—
†Standard Oil Co. of Indiana	39
†Standard Steel Works Co.	—
†Stanley Works	—
Steel & Tubes, Inc.	4
Strong, Carlisle & Hammond Co.	87
Strong Steel Foundry Co.	—
†Sturtevant, B. F., Co.	—
†Sun Oil Co.	—
†Superior Sheet Steel Co. Division of Continental Steel Corp.	—
†Superior Steel Corp.	—
†Surface Combustion Corp.	—
†Taylor-Wilson Mfg. Co.	—
Tennessee Coal, Iron & R. R. Co.	45, 48
*Thomas Spacing Machine Co.	—
Thomas Steel Co.	—
†Thomson-Gibb Electric Welding Co.	—
†Timken Roller Bearing Co.	—
†Timken Steel & Tube Co.	Front Cover
Titanium Alloy Mfg. Co.	—
Truscon Steel Co.	9
Udylite Co.	—
Union Carbide & Carbon Corp.	—
Union Carbide Sales Co.	—
†Union Drawn Steel Co.	—
United Engineering & Foundry Co.	—
United States Steel Corp. Subsidiaries	8, 43, 45, 48, 79
American Bridge Co.	
American Sheet & Tin Plate Co.	
American Steel & Wire Co.	
Carnegie Steel Co.	
Columbia Steel Co.	
Illinois Steel Co.	
National Tube Co.	
Tennessee Coal, Iron & Railroad Co.	
Upson Nut Division Republic Steel Corp.	—
†Vanadium Corp. of America	—
†Washburn Wire Co.	—
†Washburn Wire Co., Inc.	—
*Waterbury Farrel Foundry & Machine Co.	83
†Wean Engineering Co.	—
Weirton Steel Co.	87
†Wellman Engineering Co.	—
†West Leechburg Steel Co.	Inside Back Cover
West Steel Casting Co.	90
Wickwire-Spencer Steel Co.	—
Wilson, Lee Engineering Co.	—
Worth Steel Co.	—
†Wyckoff Drawn Steel Co.	—
Yale & Towne Mfg. Co.	—
*Youngstown Sheet & Tube Co.	—